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## ON THE COMPOSITION AND SOLUBILITY OF COMMERCIAL SULPHATE OF STRYCHNINE.

By M. W. Coleman.

*Read at the Pharmaceutical Meeting, February 20th.*

My attention having been directed to a brief abstract of an investigation by Rammelsberg,[1] concerning the composition of sulphate of strychnine of German commerce; and as the results attained by this eminent chemist are considerably at variance with the formula which has been assigned to the salt adopted by the United States Pharmacopœia and some other works, it seemed desirable to verify, or determine anew, the composition of the sulphate of strychnine of the American manufacturers, and to extend the investigation to the determination of its solubility and other physical characters. With this purpose in view, a series of experiments was performed in the chemical laboratory of the Philadelphia College of Pharmacy.

According to Rammelsberg the sulphate of strychnine of German commerce has the composition $C_{21}H_{22}N_2O_2H_2SO_4+2H_2O$, and must, therefore, be considered an acid sulphate, or, to avoid misunderstanding, may be designated as monostrychnine sulphate, containing two molecules of water of crystallization. The United States Pharmacopœia recognizes as officinal a neutral sulphate, or distrychnine sulphate, $(C_{21}H_{22}N_2O_2)_2H_2SO_4+7H_2O$, containing 7 molecules of water of crystallization. Salts of the manufacture of Messrs. Rosengarten & Sons, and Powers & Weightman were obtained, and will be designated respectively as 1 and 2. The first step taken was to determine to which class the officinal salt belongs, whether it consists of a neutral or acid sulphate of strychnine. This was accomplished by the estimation of the sulphuric acid contained therein. For this determination, weighed portions of the anhydrous salts were dissolved in water,

[1] Berichte der Deutsch. Chem. Ges., 1881, p. 1231, and Amer. Journ. Pharmacy, 1881, p, 627.

acidulated with hydrochloric acid, precipitated by baric chloride, filtered, the precipitate well washed, dried, ignited, and weighed.

I. 1·8094 gm. of anhydrous strychnine sulphate gave 0·5641 gm. of baric sulphate, corresponding to 13·106 per cent. of $H_2SO_4$, as seen by the following equation:

$$BaSO_4 : H_2SO_4 :: 0{\cdot}5641 : x \text{ or}$$
$$233 : 98 :: 0{\cdot}5641 : 0{\cdot}23725 \text{ or amount of } H_2SO_4 \text{ present.}$$

Then 1·8094 : 0·23725 :: 100 : x or 13·106 per cent. $H_2SO_4$.

II. 1·7883 gm. of No. 2, gave 0·5503 gm. of baric sulphate, corresponding to 12·941 per cent. of $H_2SO_4$, as seen by the equation:

$$BaSO_4 : H_2SO_4 :: 0{\cdot}5503 : x \text{ or}$$
$$233 : 98 :: 0{\cdot}5503 : 0{\cdot}23145 \text{ or amount of } H_2SO_4 \text{ present.}$$

Then 1·7883 : 0·23145 :: 100 : x or 12·941 per cent. of $H_2SO_4$ present.

On calculating the percentage of $H_2SO_4$ in a neutral and acid sulphate of strychnine, the following result is obtained:

| Calculated. | | Found. | |
|---|---|---|---|
| $(C_{21}H_{22}N_2O_2)_2H_2SO_4$. | $(C_{21}H_{22}N_2O_2)H_2SO_4$. | No. 1. | No. 2. |
| $H_2SO_4$ 12·793 per cent. | 22·685 per cent. | 13·106 per cent. | 12.941 per cent. |

On comparing these results, it is at once evident that sulphate of strychnine of the American manufacturers is a neutral salt, having the formula $(C_{21}H_{22}N_2O_2)_2H_2SO_4$.

The next step was to determine the amount of water of crystallization. According to Rammelsberg, the salt of German commerce, in addition to being an acid sulphate, contains but two molecules of water, while a neutral salt prepared therefrom contains five molecules (when crystallized from a hot solution) or six molecules when obtained by the slow evaporation of the solution. For this determination, I re-crystallized a portion of the two salts, so as to avoid any error through efflorescence. Having obtained the salts in fine crystals, they were carefully dried upon bibulous paper, and portions of each were subjected to a temperature, gradually increased to 185°C., until they ceased to loose weight. I. 0·8885 gm. of the salt lost by heating, 0·1075 gm., corresponding to 12·099 per cent. of water of crystallization. II. 0·9709 gm. of the salt lost by heating 0·1241 gm., corresponding to 12·503 per cent. of water of crystallization. In calculating the percentage of water in a salt, containing six molecules $H_2O$, and also one containing seven molecules $H_2O$, the following result is obtained:

Calculated.

I. $(C_{21}H_{22}N_2O_2)_2H_2SO_4 \cdot 6H_2O$. II. $(C_{21}H_{22}N_2O_2)_2H_2SO_4 \cdot 7H_2O$.

$H_2O$ 12·351 per cent. 14·062 per cent.

Found.

I. II.

12·099 per cent. 12·503 per cent.

From this it is seen that neutral sulphate of strychnine of commerce, contains six molecules of water of crystallization.

To determine the solubility, two methods were employed, namely: that of direct evaporation of a weighed portion of a saturated solution; and that of the estimation of the sulphuric acid in the salt, as baric sulphate. The first determination was made by preparing saturated solutions of each salt, at a temperature of 15°C., taking weighed portions of each solution, evaporating to dryness, and subjecting the residue to a temperature of 185°C., until loss in weight no longer occurred. I. 11·078 gm. of solution gave 0·2306 gm. of anhydrous sulphate of strychnine, corresponding to 0·2591 gm. of crystallized sulphate. The weight of the salt was then subtracted from the weight of solution, and gave the amount of water required, which was 10·8189 gm., and the following equation then gives the number of parts of water, in which the salt is soluble:

0·2590 : 10·8189 :: 1 : x or 41·76 parts of water.

II. 12·21 gm. of saturated solution of No. 2, gave 0·2790 gm. of crystallized sulphate of strychnine, which after further calculation gives 42·76 parts of water, in which the salt is soluble.

I next proceeded to determine the solubility by the barium method. I first tested the saturated solutions with litmus paper to test their neutrality, and found both to be exactly neutral. A weighed portion of each solution saturated at 15°C. was then precipitated by baric chloride, the precipitate washed, dried, ignited, and weighed. From the weight of baric sulphate so obtained, the amount of sulphate of strychnine present was then calculated, and from this the amount of water required to dissolve the salt. I. 9·3013 gm. of saturated solution of No. 1, gave 0·0579 gm. of baric sulphate, and the following equation represents the corresponding amount of strychnine sulphate:

$$\underset{233}{BaSO_4} : \underset{874}{(C_{21}H_{22}N_2O_2)_2H_2SO_4} + 6H_2O :: 0{\cdot}0579 : x \text{ or } :: 0{\cdot}0579 : 0{\cdot}2177 \text{ gm.}$$

The weight of sulphate of strychnine 0·2177 gm. was subtracted from the weight of solution used, which gives the weight of water used =9·0836 gm. Then, 0·2177 : 9·0836 : : 1 : x or 41·72 parts of water. II. 10·5815 gm. of saturated solution of No. 2, gave 0·0646 gm. of

baric sulphate, which corresponds to 0·2423 gm. of strychnine sulphate, and when further calculated as above, gives the number of parts of water, in which the salt is soluble, or 42·67 parts.

According to Rammelsberg, neutral strychnine sulphate becomes anhydrous at 200°C. The United States Pharmacopœia states, that, when heated to a temperature of 135°C., it first melts, and then looses its water of crystallization. On heating portions of sulphate of strychnine in an air-bath, I found that the salt became anhydrous, without melting, at 185°C., and when heated in a capillary glass tube, in a bath of sulphuric acid, it assumed a very dark-brown color at 225°C., and was evidently decomposed, without, however, at this temperature showing any indication of fusion. As seen by these experiments, strychnine sulphate of American manufacturers is distrychnine sulphate having the formula $(C_{21}H_{22}N_2O_2)_2H_2SO_4+6H_2O$. It is soluble in from 42 to 43 parts of water at 15°C. It becomes anhydrous at 185°C., without fusion, losing from 12·099 per cent. to 12·5 per cent. of its weight, and is decomposed at a temperature of about 225°C.

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## FERRIC CITRATE AND ITS DOUBLE AND SECONDARY SALTS.

By R. Rother.

It was formerly much more the practice than now, in writing the formulas of ordinary chemicals, to omit the water not belonging to the characteristic part of the compound. At that early period this approximate degree of accuracy was perhaps all sufficient. But since pharmacists have been drawn nearer to chemistry by reason of the great development of this important part of their business, it has become necessary to insist upon a more complete notation. These imperfect formulas were largely transcribed into the text-books of pharmacy and generally passed current as the whole expression for the respective compounds. Many erroneous processes and false results were the consequence of thus relying upon what was deemed authoritative. Ferric citrate is an excellent illustration of such cases. The chemical formula of this salt was invariably given as $FeC_6H_5O_7$ or Fe Ci. Considering this formula to be accurate and complete, the writer some years since attempted to determine the constitution of the official so-called ammonio citrate of iron. The result obtained apparently indicated that the ammonia was absorbed in the proportion to form normal ammonium

citrate with all the acid of the salt, and thus rendering the iron, as normal hydrate, seemingly free from combination with the acid radicle. Finding that the same volume of dilute ammonia water was absorbed by an equivalent of bismuthous citrate, the writer, with good reason, concluded that also in this case an analogous compound resulted. A recent result of the conversion of ferrous into ferric citrate, by means of nitric acid, showed that the product was greater than the received formula of ferric citrate would permit. In consequence of this effect it was then found by the usual method of heating the salt until the weight remained constant, that its complete formula is Fe Ci $1\frac{1}{2}$ $OH_2$. Treatment with ammonia now made it certain that only two instead of three equivalents of this became combined. An ammonia water of indefinite strength was then diluted with three times its volume of water and added to 105 grains of citric acid until this was dissolved and neutralized. The same dilute ammonia was then added to 136 grains of normal ferric citrate in scales until this was dissolved, and an excess of ammonia appeared. Two-thirds as much was required as in the case with citric acid. On evaporating the solution to dryness, the scaled salt weighed 158 grains. Its formula is, therefore,

$$Fe(NH_4)_2Ci(OH)_2, \text{ or}$$

$$\begin{matrix} Fe = (OH)_2 \\ | \qquad \text{and molecular weight 315.} \\ Ci = (NH_4)_2 \end{matrix}$$

Hence it is a diammonio-ferric hydrocitrate. The ammonio-bismuthous hydrocitrate is analogously constituted, 80 grains of bismuthous citrate yields 94 grains of the double salt. Its formula hence is

$$Bi\,(NH_4)_2\,Ci\,(OH)_2 \text{ or } \begin{matrix} Bi = (OH)_2 \\ | \qquad \text{and its molecular weight 469.} \\ Ci = (NH_4)_2 \end{matrix}$$

When one equivalent of ferric citrate is treated with not exceeding two equivalents of potassic hydrate, soluble scaly compounds are obtained. But when three equivalents of the alkali is added a profuse and permanent precipitate is formed. 136 grains of ferric citrate and 56 grains of potassic hydrate produce 168 grains of the scaled double citrate. Its formula is therefore Fe $K_2CiO$, or

$$\begin{matrix} Fe = O \\ | \qquad \text{with a molecular weight of 339, it being a dipotassio ferric} \\ Ci = K_2 \end{matrix}$$

oxycitrate.

The action of hydro-sodic carbonate on ferric citrate is peculiar. When equal equivalents are used, that is 272 grains of the citrate and 84 grains of the carbonate, 285 grains of an elegantly scaled and very soluble light-red non-deliquescent compound is produced. Hence its formula is

$$Fe\,Na\,Ci\,(OH) \text{ or } \begin{matrix} Fe—(OH) \\ \| \\ Ci—Na \end{matrix}$$ and molecular weight 285.

When two equivalents of the carbonate are employed, only a part of its carbonic oxide (not carbonous oxide, formerly called carbonic oxide) is expelled, the remainder being retained in the formation of a remarkable double citro carbonate, whose formula $FeNa_2CiCO_3$, or

$$\begin{matrix} Fe = CO_3 \\ | \\ Ci = Na_2. \end{matrix}$$ Hence a sodioferric citrocarbonate.

When three equivalents of the carbonate are added, a still more complicated effect is produced, 68 grains of ferric citrate and 63 grains of the carbonate yielding 98 grains of a blistered, scaly, very soluble mass. The formula of this compound is then $FeNa_3Ci\,(OH)$ or

$$\begin{matrix} (OH)—Fe—CO_3Na \\ | \\ Ci = Na_2 \end{matrix}$$ and molecular weight 391, it being a sodioferric hydro-citrocarbonate.

All of the above-described double and secondary salts are derivatives by substitution within a single molecule of citrate. An entirely different order of double and secondary salts results from the coalescence of two molecules. The most characteristic of the ferric double citrates are those formed by the normal monad citrates. They are sharply distinguished from the preceding order by their splendid green color.

Ferric citrate unites with normal citrates, as the writer first pointed out, molecule for molecule. When, for instance, 68 grains of ferric citrate is dissolved in 81 grains of potassic citrate in the presence of water, the characteristic green solution of the double salt results. This on evaporation to a dense, syrupy consistence, rapidly becomes granular and opaque, and on drying leaves a yellowish-green powdery residue, weighing 138 grains. This rather astonishing and unexpected result led the writer to question the condition of the potassic citrate, and therefore repeated the experiment by generating this citrate directly in the process. Hence 75 grains of hydro-potassic carbonate was added

to 53 grains of citric acid in the presence of water, and after effervescence ceased, united with 68 grains of ferric citrate as before. The result being exactly identical with the first one, the writer concluded that this remarkable compound is not amorphous, but crystalline or transitionally crystalline. The product of 138 grains shows that the salt is anhydrous, and that its formula is $FeK_3Ci_2$, or

$$\begin{matrix} Fe = Ci \\ | \quad | \\ Ci = K_3 \end{matrix}$$ and its molecular weight 551.

The construction of the secondary formula is necessitated by the conditions of the reaction which being distinctly chemical and taking place between two fully saturated molecules or chemically neutral salts, indicates a re-arrangement or subdivision of the atomic bonds.

The analogous sodio ferric citrate is generated by mixing 63 grains of hydro-sodic carbonate with 53 grains of citric acid and 68 grains of ferric citrate in the presence of water and evaporating to dryness. The result is 139 grains of a green, transparent scaled salt. In respect to its physical appearance, it thus differs radically from the preceding, and also in that it contains three molecules of water, its formula being $FeNa_3Ci_2.3(OH_2)$ with a molecular weight of 557.

However, the most interesting and unexpected product results from the union of ferric citrate with quinium citrate. The compound obtained is strictly analogous to the just preceding salts, and judging from an incomplete observation, is perhaps also anhydrous with a probable formula of $Fe(QuH)_3Ci_2$. This salt has the characteristic green color and is scaly transparent. It is, however, nearly insoluble in cold water, quite soluble in hot water, more soluble in hot, weak alcohol, but soluble in all proportions in strong alcohol, from which solution it is readily obtained in scales. It is unacted upon by potassic citrate, but in the additional presence of potassic sulphate, especially in the cold, with but little water, retrograde decomposition sets in and quinium and potassio ferric citrate results. Yet when ferric citrate, quinium sulphate, and potassic citrate in equivalent proportion, that is 272, 1308, and 324 parts respectively, are heated together with considerable water, nearly all the quinine is absorbed into the double salt which then precipitates as a green resinous mass that quickly hardens on cooling. This compound bears no analogy to the ordinary citrate of iron and quinium. This latter substance is an analogue of the one molecule double salts in which the alkaloid is absorbed only to the amount of about a tenth of a quinic molecule.

# FLUID EXTRACTS OF THE NEW PHARMACOPŒIA.

By Alonzo Robbins.

*Read at the Pharmaceutical Meeting, February 20.*

(Continued from page 75.)

Extractum Cypripedii Fluidum.—*Fluid Extract of Cypripedium.*—This newly introduced preparation is one of the eleven added to the list by the Committee of Revision, it was under consideration by the Committee of the Philadelphia College of Pharmacy, but was finally rejected, on the ground that little or no demand existed for the preparation. The officinal menstruum is alcohol, but it is quite probable that a menstruum composed of two parts of alcohol, and one part of water, would have been sufficiently strong.

Extractum Digitalis Fluidum.—*Fluid Extract of Digitalis.*—The menstruum directed for this preparation by the Pharmacopœia of 1870, was alcohol twelve fluidounces, glycerin three fluidounces, and water one fluidounce, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs a mixture of three parts of alcohol, and one part of water; the Philadelphia College of Pharmacy recommended alcohol, and several previous investigators have also recommended the same menstruum. A sample prepared in December, 1879, with a menstruum composed of two parts of alcohol and one part of water, deposited a considerable precipitate soon after it was finished; another sample prepared at the same time, with alcohol, kept with only slight precipitation for nearly two years, and even at the present time, there is only about one-fourth as much deposit in it, as there is in the other sample, but there is also deposited on the sides of the bottle a thin waxy coating, from which the other sample is quite free; it is quite probable that the officinal menstruum is the best for this preparation; should it still after a time precipitate, the addition of five or ten per cent. of glycerin would most likely render it permanent. These experiments were made with the English leaves, results obtained from the use of the cheap commercial leaves might have been, and probably would have been, quite different.

Extractum Dulcamaræ Fluidum.—*Fluid Extract of Dulcamara.*—For this preparation the Pharmacopœia of 1870 directed alcohol eight fluidounces, glycerin three fluidounces, and water five fluidounces, finishing the percolation with diluted alcohol, and adding one fluid-

ounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs diluted alcohol, and the Philadelphia College of Pharmacy recommended one part of alcohol, and two parts of water as the menstruum. A sample thus prepared in January, 1880, has only a moderate deposit, which formed soon after the sample was made; it is extremely doubtful if the stronger officinal menstruum possesses any advantages in this preparation.

Extractum Ergotæ Fluidum.—*Fluid Extract of Ergot.*—This is one of the most important preparations in the Pharmacopœia. A reputation gained among physicians for having this article always of a reliable quality, will contribute largely to the professional standing and pecuniary success of the pharmacist; more especially will this be the case if the preparation is the product of his own skill; if the pharmacist sells the preparation of a manufacturer even of the highest reputation for reliability, he gains nothing but the dealer's profit, which, indeed, is all that he deserves, for all the credit of making a good article, belongs to the man who makes it, and not to the mere shopkeeper who simply sells it.

As the menstruum for this preparation the Pharmacopœia of 1870 directed alcohol eight fluidounces, glycerin three fluidounces, and water five fluidounces, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin, and half a fluidounce of acetic acid to the dilute percolate previous to evaporation. The present Pharmacopœia directs a mixture of three parts of alcohol, and four parts of water, adding six per cent. of diluted hydrochloric acid to the dilute percolate before evaporation. The Philadelphia College of Pharmacy recommended one part of alcohol, and one part of water, with one per cent. of acetic acid added to the dilute percolate. The officinal menstruum may be readily obtained by using equal volumes of alcohol and water, which have the specific gravity of ·935, while the officinal is only ·936, and as equal weights of alcohol and water, have the specific gravity of ·928, the difference between the officinal menstruum, and that recommended by the Philadelphia College of Pharmacy is insignificant, therefore, the two preparations may be considered identical, except in the use of different acids in the dilute percolate; recent scientific investigations having conclusively established the fact that no acid is required for the protection or preservation of the active constituents of ergot, such addition might well be omitted,

though it is probably not injurious to the preparation; if either is retained, the preference seems to be in favor of the acetic acid.

In regard to the proper menstruum for ergot, it is well known, that water alone extracts the active constituents, the extractum secalis cornuti of the German Pharmacopœia, and the extractum ergotœ liquidum of the British Pharmacopœia, are both prepared with that menstruum, fifty per cent. of rectified spirit being added to the evaporated aquous extract in the English preparation. One of the most careful and competent investigators, who is also a large manufacturer of fluid extracts, has recommended a menstruum composed of one part of alcohol and three parts of water.

After a number of previous experiments, a series of four fluid extracts, differing only in the menstruums, was made in January, 1880.

No. 1. With a menstruum composed of one part of alcohol and one part of water, with one per cent. of acetic acid in the dilute percolate. This is the formula finally recommended by the Philadelphia College of Pharmacy.

No. 2. The same menstruum, without the acetic acid.

No. 3. With a menstruum composed of one part of alcohol and two parts of water, also without acid.

No. 4. With one part of alcohol, and three parts of water, without acid.

None of these samples have either been decanted or filtered, and now, three years after they were made, the deposit in each is about equal, but only moderate in amount, being about the one-eighth of an inch deep in a four ounce bottle; in both number one and two, a black, tarry matter covers the upper part of the bottle above the fluid extract, which has also become darker than when first made, and is no longer quite transparent. With the exception of the deposit above referred to, numbers three and four remain as when first made, reddish brown in color and transparent in thin layers. Number three is decidedly preferable to either number one or two. I have made considerable quantities by this formula during the last three years, to my own satisfaction, and with the approval of physicians. The only reason why number four was not used, was the fear that it might not contain sufficient alcohol for its preservation under all circumstances, in hot weather. As number three may be said to keep for an unlimited period, and as it is not always possible to get good ergot, the

pharmacist would do well, when he does find a good article, to make up a considerable quantity of the fluid extract.

EXTRACTUM ERYTHROXYLI FLUIDUM.—*Fluid Extract of Erythroxylon.*—This is a newly introduced preparation, it is not probable that the officinal English title will supercede the name of fluid extract of coca, by which this preparation is commonly known. The Pharmacopœia directs diluted alcohol as the menstruum, and the Philadelphia College of Pharmacy recommended the same. A sample of the fluid extract prepared in December, 1879, remains in good condition, with only a slight precipitate, and a very small quantity of waxy matter on the upper part of the bottle.

EXTRACTUM EUCALYPTI FLUIDUM.—*Fluid Extract of Eucalyptus.*—This is also one of the new fluid extracts. The Pharmacopœia directs alcohol to be used in its preparation, and the Philadelphia College of Pharmacy recommended the same menstruum. A sample thus made in December, 1879, remained without change for some time, but it now contains a moderate quantity of sediment, and above this appears a large quantity, about one-fourth of the bulk of the fluid extract, of greenish, somewhat gelatinous, separated matter, thus affording sufficient evidence that alcohol is not the proper menstruum for this preparation. Another sample was made at the same time as the first one, with a menstruum composed of three parts of alcohol and one part of water, this soon deposited a moderate precipitate, but no further change has occurred, and this sample now, after three years have elapsed, possesses all the characteristics of a good fluid extract; this menstruum is therefore recommended as being decidedly better for eucalyptus, than alcohol alone.

EXTRACTUM EUPATORII FLUIDUM.—*Fluid Extract of Eupatorium.*—This is one of the new fluid extracts. The Pharmacopœia directs diluted alcohol as the menstruum, the Philadelphia College of Pharmacy recommended one part of alcohol and two parts of water; a sample thus prepared in December, 1879, now contains only a moderate deposit, and the liquid portion is perfectly transparent, and of a deep red color in thin layers; it has acquired a very peculiar odor, and has apparently undergone some change. The officinal menstruum is no doubt the best for this not very important preparation.

EXTRACTUM FRANGULÆ FLUIDUM.—*Fluid Extract of Frangula.*—This is also a newly introduced preparation. The Pharmacopœia directs a menstruum composed of one part of alcohol and two parts of

water, which strength was also recommended by the Philadelphia College of Pharmacy; a sample thus prepared in December, 1879, now contains rather more than a moderate precipitate, it being about one-quarter of an inch deep in a four ounce bottle, but is otherwise in good condition, of a deep red color, and perfectly transparent in thin layers.

EXTRACTUM GELSEMII FLUIDUM.—*Fluid Extract of Gelsemium.*—For this preparation the Pharmacopœia of 1870 directed alcohol (sp. gr. 835), the present Pharmacopœia also directs alcohol. The Philadelphia College of Pharmacy recommended diluted alcohol as the menstruum, and a sample thus prepared in December, 1879, now contains a slight precipitate, but is otherwise in good condition; it is probable, however, that the officinal menstruum is the best for this preparation.

EXTRACTUM GENTIANÆ FLUIDUM.—*Fluid Extract of Gentian.*—For this preparation the Pharmacopœia of 1870 directed a menstruum composed of alcohol, eight fluidounces, glycerin, three fluidounces, and water, five fluidounces, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs diluted alcohol, and the Philadelphia College of Pharmacy recommended the same. A sample thus prepared in December, 1879, now contains only a very moderate precipitate, which formed soon after its preparation; in every other respect it is in good condition. As the menstruum for the solid extract of gentian is water alone, it is quite probable that a weaker spirit than diluted alcohol would have answered for the fluid extract.

EXTRACTUM GERANII FLUIDUM.—*Fluid Extract of Geranium.*—For this preparation the Pharmacopœia of 1870 directed a menstruum composed of alcohol, eight fluidounces, glycerin, three fluidounces, and water, five fluidounces, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs diluted alcohol, with ten per cent. of glycerin in the first one hundred parts of the menstruum; the Philadelphia College of Pharmacy recommended the same, and a sample thus prepared in December, 1879, kept very well for a long time, and has now only a moderate precipitate; but about one-third of the lower portion of the fluid extract has become of a slightly gelatinous character, this however readily mixes with the remainder, and then it presents a rather fair appearance. Another

sample prepared at the same time, and differing only in containing twenty per cent. of glycerin, appears to be even more changed than the first, with a much larger sedimentary deposit. It is evident that this preparation, to be made permanent, requires a more alcoholic menstruum, and a mixture of three parts of alcohol and one part of water, with ten per cent. of glycerin in the first one hundred parts, is suggested as being likely to accomplish that object; should this also fail, it may even be necessary, as in the case of cotton root, to omit the water entirely.

Extractum Glycyrrhizæ Fluidum.—*Fluid Extract of Glycyrrhiza.*—The fluid extract of liquorice root of the Pharmacopœia of 1870, was prepared with a menstruum composed of eight fluidounces of alcohol, three fluidounces of glycerin, and five fluidounces of water; finishing the percolation with diluted alcohol, and adding one fluid ounce of glycerin to the dilute percolate before evaporating. The present Pharmacopœia directs diluted alcohol, with three per cent. of water of ammonia in the first one hundred parts of menstruum, and three per cent. more in the dilute percolate previous to evaporation. The Philadelphia College of Pharmacy recommended a menstruum composed of one part of alcohol, and three parts of water, with twenty per cent. of glycerin, and five per cent. of water of ammonia in the first one hundred parts. A sample thus prepared in December, 1879, now contains only the slight precipitate which formed soon after it was made, and in all other respects it is in excellent condition. In regard to the officinal formula, the utility of adding a portion of the water of ammonia to the dilute percolate is not apparent, it would seem to be more advantageous to add all that is used to the menstruum, so that its solvent action may be exercised on the drug; neither does it appear necessary to use as strong a menstruum as diluted alcohol. A menstruum containing as little as twenty per cent. of alcohol, has been recommended by an operator of the greatest ability; as water alone will exhaust liquorice root, the chief use of alcohol in the fluid extract is as a preservative; regarding the use of glycerin in this preparation, it is possible that ten per cent. might be sufficient, although a sample made with that proportion precipitated considerably more than the sample containing twenty per cent.

Extractum Gossypii Radicis Fluidum.—*Fluid Extract of Cotton Root.*—For this preparation the Pharmacopœia of 1870 directed a menstruum composed of eight fluidounces of alcohol, three fluid-

ounces of glycerin, and five fluidounces of water, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs alcohol, with thirty-five per cent. of glycerin in the first one hundred parts of menstruum; the Philadelphia College of Pharmacy recommended alcohol also, but with only twenty per cent. of glycerin. A sample thus prepared in November, 1879, now shows only a moderate precipitate, about the one-eighth of an inch deep in a four ounce bottle, the sides of the bottle are coated with a uniform, exceedingly thin, brown transparent deposit, the fluid extract retains its deep red color, and is without any signs of gelatinization. Another sample prepared at the same time as the first, and differing only in containing forty per cent. of glycerin, now shows considerable deposit, about the one-fourth of an inch deep in a four ounce bottle, the coating on the sides of the bottle is less uniform, and of a bright red color, numerous masses of gelatinous substance, very small at the top, and increasing in size towards the bottom, are also attached to the sides of the bottle; about one-fourth of the lower portion of the fluid extract has gelatinized, it however mixes readily with the remaining portion, and the whole of it still retains its deep red color. From this it would appear that twenty per cent is a decidedly better proportion of glycerin than forty, or so near an approach to that amount as thirty-five; if the alcohol used was absolute, and the glycerin of the highest attainable specific gravity, then it is possible that forty, or even fifty, per cent. could be employed without injuriously affecting the preparation, but the nine per cent. of water in officinal alcohol, and the varying amount in the best commercial glycerin, are sufficient to cause the preparation to prove unstable, it having been conclusively shown that the failure of the former officinal process was due to the presence of water in the menstruum.

Extractum Grindeliæ Fluidum.—*Fluid Extract of Grindelia.*—This is a newly introduced fluid extract, the Pharmacopœia directs a menstruum composed of three parts of alcohol, and one part of water; the Philadelphia College of Pharmacy recommended alcohol, and a sample so prepared in December 1879, now contains only a very slight precipitate, is of a pure green color, and apparently has undergone no change whatever. Another sample prepared with the officinal menstruum, in November, 1882, is of a brownish-green color, has a slight deposit of a white substance like fine sand, the sides of the

bottle are thinly coated with the same, and floating particles of it are distributed throughout the entire body of the fluid extract; a menstruum similar to the officinal, was recommended for grindelia by a California writer several years ago, and no doubt this weaker spirit was adopted by the Committee of Revision for some other reason than cheapness, but its superiority over alcohol is not apparent.

EXTRACTUM GUARANÆ FLUIDUM.—*Fluid Extract of Guarana.*—This is also a new preparation, the Pharmacopœia directs a menstruum composed of three parts of alcohol and one part of water; the Philadelphia College of Pharmacy recommended two parts of alcohol and one part of water. A sample thus prepared in December, 1879, has only a very slight precipitate, and is in every other respect perfect; a spirit of the officinal strength appears to be quite unnecessary, although it may furnish an equally permanent preparation.

EXTRACTUM HAMAMELIDIS FLUIDUM.—*Fluid Extract of Hamamelis.*—This is one of the eleven added to the list by the Committee of Revision; the memstruum directed is one part of alcohol, and two parts of water, which no doubt thoroughly extracts the witchhazel leaves.

EXTRACTUM HYDRASTIS FLUIDUM.—*Fluid Extract of Hydrastis.*—For this preparation the Pharmacopœia of 1870 directed fourteen fluidounces of alcohol, and two fluidounces of glycerin, finishing the percolation with a mixture of two parts of alcohol, and one part of water The present Pharmacopœia directs a menstruum composed of three parts of alcohol and one part of water. The Philadelphia College of Pharmacy recommended the same; a sample thus prepared in November, 1879, now contains a moderate precipitate, and a very thin coating of brownish color deposited on the sides of the bottle, in all other respects the sample is in good condition. Another sample prepared at the same time, with a menstruum of one part of alcohol, and one part of water, with ten per cent. of glycerin in the first one hundred parts, now contains only a very slight sediment, and no deposit on the sides of the bottle; this fluid extract, however, is not quite as transparent as the other sample. The addition of ten per cent. of glycerin to the first one hundred parts of the officinal menstruum, would probably prevent all precipitation.

EXTRACTUM HYOSCYAMI FLUIDUM.—*Fluid Extract of Hyoscyamus.*—For this preparation the Pharmacopœia of 1870 directed a menstruum composed of twelve fluidounces of alcohol, three fluid-

ounces of glycerin, and one fluidounce of water, finishing the percolation with diluted alcohol, and adding one fluidounce of glycerin to the dilute percolate before evaporation. The present Pharmacopœia directs three parts of alcohol, and one part of water, and the Philadelphia College of Pharmacy recommended the same menstruum. A sample thus prepared in December, 1879, now contains only a very slight deposit, less than the one-eighth of an inch deep in a four-ounce bottle; this, with a few small specks of matter attached to the sides of the bottle, is the only change that the sample appears to have undergone. Another sample made at the same time as the first, with alcohol alone as the menstruum, now contains a very large deposit, being fully an inch deep in a four-ounce bottle, also considerable matter on the sides, and a coating of waxy nature on the upper part of the bottle above the fluid extract.

The appearance of these samples indicates that the officinal menstruum is best for this preparation. These experiments were made with Allen's English leaves; if the ordinary commercial leaves had been used, the result might have been different.

EXTRACTUM IPECACUANHÆ FLUIDUM.—*Fluid Extract of Ipecac.*—For this preparation the Pharmacopœia of 1870, directed twenty-four fluidounces of stronger alcohol and twelve fluidounces of water, finishing the percolation with diluted alcohol, and adding eight fluidounces of glycerin to the entire percolate before evaporation. The present Pharmacopœia directs the use of alcohol as the menstruum, and by means of a water bath distils off the alcohol from the entire percolate, which is then to be evaporated to seventy-five cubic centimeters, and when cool filtered, the precipitate on the filter is to be washed with water, until the water passes through tasteless, the filtrate and washings are to be reduced by evaporation to fifty cubic centimeters, and when cool, enough alcohol is to be added to make the fluid extract measure one hundred cubic centimeters. The Philadelphia College of Pharmacy recommended a menstruum composed of three parts of alcohol and one part of water; a sample thus prepared in January, 1880, deposited soon after it was made, a moderate precipitate, which has not been increased since, and the sample now appears to be in very good condition.

The Committee of Revision must have been convinced before they adopted the present officinal formula, that the repeated and prolonged applications of heat therein directed, do not injuriously affect the active

constituents of ipecac. While it cannot be positively asserted that such treatment does lessen the activity of the preparation, it certainly cannot be claimed to increase it; the obvious object of the special procedure directed in the preparation of this fluid extract, being to furnish a product that will form a permanently transparent preparation when mixed with syrup, and as it may be doubted that even this process will always accomplish that object, it would seem preferable to prepare the fluid extract in the ordinary way, and then make the syrup by a process which can always be depended upon, although it may involve a little more pharmaceutical labor in carrying it out.

When the fluid extract is made by the formula recommended by the Philadelphia College of Pharmacy, the eighty-five parts of reserved percolate will contain at least ninety-five per cent. of the soluble portion of the ipecac, and only the small amount contained in the dilute percolate is subjected to heat. This fluid extract when mixed with the proper quantity of water, and after standing a few hours filtered, and the sugar dissolved in the filtrate, either by moderate heat, by agitation in a bottle, or by cold percolation, will yield a syrup entirely free from suspicion of injury during the process of its preparation.

Such a method for this syrup, with the addition of twenty per cent. of glycerin, has been used for years by the writer and other pharmacists, with entire satisfaction; no fermentation, precipitation, or separation of flocculent matter occurring in the syrup so made, even when kept for years, and exposed in partly filled bottles, to the varying temperature of the store in all seasons.

Recently published experiments appear to indicate that the addition of a small quantity of water of ammonia, to a very dilute alcoholic menstruum, will also furnish a transparent and permanent syrup, but such addition will undoubtedly cause a chemical change in the constituents of the ipecac, and while this change is probably not injurious to its medicinal value, it would seem preferable to employ an equally effective preservative, which would be entirely without chemical action.

Extractum Iridis Fluidum.—*Fluid Extract of Iris.*—This fluid extract is one of the eleven added to the list by the Committee of Revision; the menstruum directed for its preparation is composed of three parts of alcohol, and one part of water, which will no doubt thoroughly exhaust the blue flag root, and supply a permanent and reliable preparation of an active indigenous drug.

(To be continued.)

## GALENICAL PREPARATIONS OF THE GERMAN PHARMACOPŒIA.

(Continued from page 82.)

*Mucilago Salep.*—Shake together in a vial, powdered salep 1 part, and water 10 parts, until the powder is uniformly distributed; then add boiling water 90 parts, and shake the mixture well while cooling. It should be freshly prepared for dispensing.

*Oleum cantharidatum.*—Mix coarsely powdered cantharides 3 parts, with rape-seed oil 10 parts, digest in a steam bath for 10 hours, express and filter. It has a green-yellow color.

*Oleum Hyoscyami.*—Macerate hyoscyamus herb 4 parts, and alcohol 3 parts for several hours, add olive oil 40 parts, and digest in a steam bath with occasional agitation until the alcohol has been driven off, express and filter. It is of a brownish-green color.

*Oxymel Scillæ.*—Mix vinegar of squill 5 parts with clarified honey 10 parts, evaporate by means of a steam bath to 10 parts and strain. It is limpid and brown-yellow.

*Pilulæ Jalapæ.*—Mix jalap soap 3 parts, and powdered jalap 1 part, and divide the mass into pills, each weighing 0·1 gm. Roll the pills in lycopodium and dry them in a warm place.

*Potio Riveri.*—Dissolve citric acid 4 parts in water 190 parts, add carbonate of sodium in small crystals 9 parts, and agitate moderately until dissolved, then cork the vial. It should be freshly prepared for dispensing.

*Pulvis aërophorus.*—Bicarbonate of sodium 10 parts; tartaric acid 9 parts; sugar 19 parts; reduce each article separately to a fine powder and dry it at a moderate heat; then mix.

*Pulvis aërophorus Anglicus.*—Each dose contains bicarbonate of sodium 2 gm., wrapped in colored paper, and tartaric acid 1·5 gm., wrapped in white paper.

*Pulvis gummosus.*—Mix powdered gum arabic 15 parts, powdered liquorice root 10 parts, and powdered sugar 5 parts. The powder is yellowish-white and has the odor and taste of liquorice root.

*Pulvis Salicylicus cum Talco.*—Salicylic acid 3 parts, wheat starch 10 parts, talc 87 parts; reduce to a fine powder and mix.

*Rotulæ Menthæ piperitæ.*—Dissolve oil of peppermint 1 part in alcohol 2 parts, and with this solution dampen sugar drops 200 parts.

*Sal Carolinum factitium.*—Exsiccated sulphate of sodium 44 parts;

sulphate of potassium 2 parts; chloride of sodium 18 parts; bicarbonate of sodium 36 parts; reduce to fine powder and mix.

A solution of 6 grams of this salt in 1 liter of water is very similar to *Carlsbad water*.

*Sapo jalapinus.*—Dissolve resin of jalap and medicated soap, of each 4 parts in alcohol (sp. gr. 894) 8 parts, and evaporate in a steam bath, with continual agitation, until the mass weighs 9 parts. It is brown-yellow, soluble in alcohol, and yields with 2 or 3 parts of water a turbid solution; with from 10 to 20 parts of water a nearly clear solution is obtained, which does not separate any resin.

*Sapo kalinus.*—Solution of potassa (sp. gr. 1·144) 135 parts; linseed oil 100 parts; mix gradually in a water bath, heat for half an hour, stirring continually, and thoroughly mix with alcohol 25 parts; add gradually water 200 parts, and continue the heat until a pellucid jelly-like soap is formed, which dissolves in hot water without separating any oil; then evaporate by means of a steam bath until the alcohol has been expelled and the weight is reduced to 150 parts.

*Soft Soap* thus prepared, is brownish-yellow, pellucid, slippery, of a slight, but not nauseous odor, free from granules, and soluble in water and alcohol; it must always be dispensed unless sapo kalinus venalis is especially prescribed.

*Sapo medicatus.*—The saponification is effected in a similar manner as in the preceding case, solution of caustic soda (sp. gr. 1·161) 120 parts, being first heated with a mixture of 50 parts each of lard and olive oil; then alcohol 12 parts, and water 200 parts are added. When the saponification has been completed, the soap is separated by the addition of a solution of sodium chloride 25 parts, and sodium carbonate 3 parts, in water 30 parts, strongly expressed and dried. It is white, free from rancid odor, and soluble in water and alcohol.

*Saturationes.*—Unless otherwise indicated, *potio Riveri* is dispensed, when a saturation (neutral mixture) is prescribed.

*Species.*—The substances used for these mixtures, are to be uniformly comminuted and freed from the fine powder; for the preparation of infusions or decoctions, they should be passed through sieves with meshes from 4 to 6 millimeters wide; for pulverulent species the meshes should measure 2 to 3 millimeters.

*Species aromaticæ.*—Peppermint, garden thyme, wild thyme and lavender flowers, of each 2 parts, cloves and cubeb, of each 1 part; mix.

*Species emollientes.*—Marshmallow leaves, mallow leaves, melilot herb, German chamomile flowers and flaxseed, each in coarse powder, equal parts.

*Species laxantes.*—Dampen cut senna 16 parts, mix thoroughly with cream of tartar 4 parts and dry; then add elder flowers 10 parts, fennel and anise, each 5 parts, and mix.

*Species Lignorum.*—Guaiacum wood 5 parts, rest-harrow root 3 parts, peeled liquorice and sassafras root, each 1 part; mix.

*Species pectorales.*—Marshmallow root 8 parts, peeled liquorice root 3 parts, orris root 1 part, colt's-foot leaves 4 parts, mullein flowers and anise, each 2 parts; mix.

*Spiritus Angelicæ compositus.*—Macerate for 24 hour angelica root, cut, 16 parts, valerian cut 4 parts, and juniper berries bruised 4 parts in alcohol 75 parts and water 125 parts; then distil 100 parts and dissolve in the distillate camphor 2 parts. It is clear, colorless and of the density ·890 to ·900.

*Spiritus Cochleariæ.*—Mix the fresh flowering herb of scurvy grass (*Cochlearia officinalis*) 8 parts with alcohol and water, each 3 parts, and distil 4 parts. It is colorless, of a peculiar odor and burning acrid taste, and has the density ·908 to ·918. If solution of potassa be added to a mixture of 5cc. of the spirit with solution of ·1 gm. acetate of lead in 5cc. of water, until the precipitate is redissolved, and the solution then heated to boiling, a dark color and gradually a black precipitate is produced.

*Spiritus Formicarum.*—Formic acid (sp. pr. 1·060 to 1·063) 4 parts, alcohol 70 parts and water 26 parts; mix. It is colorless, of an acid reaction and has the specific gravity ·894 to ·898. It produces with solution of subacetate of lead white feathery crystals, and when heated with nitrate of silver yields a precipitate of metallic silver.

*Spiritus Melissae compositus.*—Melissa 14 parts, lemon peel 12 parts, nutmeg 6 parts, cinnamon and cloves, each 3 parts, alcohol 150 parts, water 250 parts; distil 200 parts. It is clear, colorless, of an aromatic odor and taste and has a density of ·900 to ·910.

*Spiritus Sinapis.*—Volatile oil of mustard 1 part, alcohol 49 parts; dissolve. Its specific gravity is ·833 to ·837.

*Luccus Juniperi inspissatus.*—Fresh juniper berries bruised 1 part, hot water 4 parts; macerate for 12 hours, stirring occasionally, express and evaporate to the consistence of a thin extract. It is dark brown, of a sweet aromatic, not empyreumatic taste, and dissolves not entirely

clear in an equal weight of water; this solution acidulated with hydrochloric acid does not deposit copper upon a bright iron rod immersed in it for half an hour.

*Syrups*, unless otherwise directed, are prepared by dissolving the sugar at a moderate heat and then heating just to boiling.

*Syrupus Cerasorum.*—Black cherries, bruised with the seeds, are kept in a covered vessel at a temperature of about 20°C. with occasional agitation, until a filtered portion, on being mixed with half its bulk of alcohol, does not become turbid. Express, filter and in 35 parts of the filtrate dissolve 65 parts of sugar.

*Syrupus Cinnamomi.*—Coarsely-powdered Chinese cinnamon 10 parts, cinnamon water 50 parts; macerate for two days, strain and in 40 parts of the liquid dissolve sugar 60 parts; yield 100 parts.

*Syrupus Ferri oxydati solubilis.*—Soluble saccharated ferric oxide, water and simple syrup, equal parts; mix. 100 parts contain 1 part of iron.

*Syrupus Liquiritiæ.*—Cut peeled liquorice root 20 parts, ammonia water 10 parts, water 100 parts; macerate for 12 hours, express the liquid, heat to boiling, evaporate in a steam-bath to 10 parts, add alcohol 10 parts, after 12 hours filter and to the filtrate add sufficient simple syrup to make 100 parts.

*Syrupus Mannæ.*—Dissolve flake manna 10 parts in water 40 parts, filter, add sugar 50 parts, dissolve and filter. It weighs 100 parts and is of a yellowish color.

*Syrupus Menthæ.*—Peppermint leaves cut 10 parts, dampen with alcohol 5 parts and macerate for a day in water 50 parts. Strain without pressure and dissolve in 40 parts of the liquid 60 parts of sugar. It is greenish-brown.

*Syrupus Papaveris.*—Poppy capsules, freed from the seeds and cut, 10 parts, alcohol 5 parts, water 50 parts; digest in a steam-bath for an hour, strain, filter, and from 35 parts of the liquid and 65 parts of sugar prepare 100 parts of syrup. It is brownish-yellow.

*Syrupus Rhamni catharticæ* is prepared from fresh buckthorn berries like syrup of cherries.

*Tartarus boraxatus.*—Dissolve in a porcelain dish borax 2 parts in water 20 parts, add cream of tartar 5 parts, and heat by means of a steam bath, stirring frequently, until solution has been effected; filter, evaporate at a moderate heat, until a thick mass results, dry this in thin layers and, while still warm, reduce it to powder. It is white,

deliquescent, of an acid reaction and taste, and dissolves in an equal weight of water.

*Tinctures* are prepared by maceration, with frequent agitation, for a week in closed vessels, kept in a shady place at a temperature of about 15°C.; the liquid is strained, if necessary expressed, and after subsidence filtered, the funnel being covered to prevent evaporation.

*Tinctura Absinthii.*—Wormwood 1 part, alcohol (sp. gr. ·894) 5 parts. Dark brownish-green, very bitter.

*Tinctura Aloes composita.*—Cape aloes 6 parts, rhubarb, gentian, zedoary and saffron, each 1 part, alcohol (sp. gr. ·894) 200 parts. Yellowish and red-brown, aromatic, very bitter, not rendered turbid by water.

*Tinctura amara.*—Gentian, centaury herb, each 3 parts, bitter orange peel 2 parts, orange berries and zedoary, each 1 part, alcohol (sp. gr. ·894) 50 parts. Greenish-brown, aromatic and bitter.

*Tinctura aromatica.*—Chinese cinnamon 5 parts, ginger 2 parts, galangal, cloves, cardamom, each 1 part, alcohol (sp. gr. ·894) 50 parts. Brown-red, very aromatic.

*Tinctura Calami.*—Calamus, unpeeled, 1 part, alcohol (sp. gr. ·894) 5 parts. Brownish-yellow, bitter aromatic, pungent.

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## NOTE ON THE ORIGIN OF CASSIA LIGNEA.[1]

By W. T. Thiselton Dyer, M.A., F.R.S.,
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The spice now known in pharmaceutical literature under the name of *Cassia lignea* has, from time immemorial, been an article of trade from South China. Flückiger and Hanbury are indeed of opinion that it was the cinnamon of the ancients, what now bears the name being peculiar to Ceylon and unnoticed as a product of the island till the thirteenth century.[2] Cinnamon and cassia are, however, enumerated amongst the products of the East from the earliest periods; and the former was known to the Arabians and Persians as *Darchini* (*dar*, wood or bark, and *chini*, Chinese). It seems in ancient times to have been carried by Chinese traders to the Malabar coast, where it passed into the commerce of the Red Sea. In this way the statements of Dioscorides, Ptolemy, and others, are accounted for, who speak of cin-

[1] From the *Journal of the Linnean Society*, December 18, 1882.
[2] "Pharmacographia," pp. 520, 521.

namon as a product of Arabia and Eastern Africa, countries in which there is no reason to suppose it ever grew. At the present day it is still an important item in Chinese commerce. I find, from the Statistical Returns of the Chinese Imperial Customs (for copies of which Kew is indebted to Sir Robert Hart), that the export from China for the last two years stands as follows:[1]

| | Quantity. | Value. |
|---|---|---|
| 1880..... | 38,784 piculs, | 225,692 Haikwan taels. |
| 1881..... | 57,456 " | 300,303 " |

1 picul = 133⅓ lbs.; 1 Haikwan tael = 5*s.* 6½*d.*

With regard to the botanical source of *Cassia lignea*, it is remarkable, considering its ancient history and its present importance in trade, that up to the present time nothing certain has been ascertained. Flückiger and Hanbury remark:—"Although it is customary to refer it without hesitation to a tree named *Cinnamomum Cassia*, we find no warrant for such reference; no competent observer has visited and described the cassia-yielding districts of China proper, and brought therefrom the specimens requisite for ascertaining the botanical origin of the bark."[2]

Bentley and Trimen also remark, in their "Medicinal Plants,"[3] "Though it is probable that this species (*Cinnamomum Cassia*) affords Chinese cassia, the fact has never been proved."

In the face of the uncertainty felt by these authorities, it appeared to be desirable to have the point, if possible, cleared up. The attention of the Colonial Office was accordingly drawn to the matter, November 18, 1881; and it was suggested that Mr. Charles Ford, Superintendent of the Botanical and Afforestation Department, Hong Kong, might be allowed, with the consent of his Government, to proceed to the cassia plantations on the West River for the purpose of reporting on the cultivation and collection of *Cassia lignea*, as well as of bringing back for distribution from the Hong Kong Botanic Garden living and dried botanical specimens of the authentic plant. Lord Kimberley was so good as to approve of the proposal; and in the month of May last Mr. Ford accordingly started for the cassia districts of the West River, the Sai Kong. He completely succeeded in the object of the expedition, and described his journey and its results in a Report to the Hong Kong Government, August 9. This report has been printed as a

[1] "Returns of Trade at the Treaty Ports for the year 1881," p. 10.

[2] "Pharmacographia," p. 528.

[3] Vol. iii., *sub tab.* 223.

Government Notification (No. 339); but as in that form its circulation will necessarily be very limited, I think the facts deserve the wider circulation which will be afforded by the Society's Journal.

Mr. Ford's journey was timed so that he might be in the districts at the season when the trees were flowering. This enabled him to obtain authentic specimens for their botanical identification, and also to witness the operation of obtaining and preparing the bark.

Mr. Ford gives the following account of the geographical position and extent of the cassia districts:

"There are three chief districts where the Cassia is cultivated, viz.:—Taiwu, in lat. 23° 34′ N., and long. 110° 18′ E. in the Kwangi province; Lukpo, in lat. 23° 6′ N., and long. 112° 24′ E.; and Loting, in lat. 22° 52′ N., and long. 111° 8′ E., both in the Kwangtung province. These are the market towns of the district; but the cassia is cultivated over a large area of country stretching to considerable distances from the towns, the extent of which could not be ascertained, owing to the unreliable accounts given by the different people questioned, who either had very vague notions of area, or were disinclined, as they usually are, to give information to foreigners.

"Taiwu is about four or five miles from the West River, and is reached by a pleasant walk leading over a plain; but the nearest cassia plantations are situated twenty-five or thirty miles further in a southern or southwesterly direction, to which there is no communication by river. Taiwu is about one hundred and eighty miles west of Canton. The Taiwu people said that the area of cultivation was not increasing.[1]

"The next most important, if not the *most* important (or at least tending in that direction) district is the Loting one, commencing at about eight or ten miles distant from the city of Loting. After leaving the West River, about eighty miles of the Loting River—the Nam Kong—has to be traversed before reaching the city, and from there the distance to the plantations has to be accomplished overland. One of the largest cultivators said that in this district there were about 1,000,000 *maus* (about 52,600 English acres) under cultivation, and that the area was greatly extending every year. The cultivation of cassia has been carried on here for only about twenty-five years, *i.e.*,

[1] "Near the town of Taiwu, according to Mr. Moss ('Narrative of an Exploration of the West River,' 1870), the best cassia bark is produced" (Bretschneider, "Early European Researches into the Flora of China," p. 13).

since the Tai-Ping rebellion, at which time, for the preservation of the plants and protection of them from destruction by the rebels, they were transferred from a district further south, at which it is reported the cultivation of cassia was abandoned when it was commenced at Loting.

"The next district is that of Lukpo, which is much less important than the other two. The city of Lukpo is situated on the northern bank of the West River; and the plantations are situated at about fifteen miles between the nearest one and the city.

"In addition to these places there are several small localities near the West River at intermediate places, where small patches of cassia are grown; and as the quantities of bark obtained are too small to send to market towns, it is brought off by small boats and sold to larger boats which carry produce down the river.

"About six miles southwest of the small town of To Shing, which is situated on the southern bank of the river, about twenty-five miles above the confluence of the Loting and West rivers, there are some plantations, from which, however, no bark has been obtained for two years and no new plantations made for ten, because the low prices which can now be obtained for the bark do not leave any profit to the producer. This was the only instance which came to my knowledge of the decrease of the trade in the cassia production, although it is said that the Java cassia trade, in consequence of the lower prices at which the cassia can there be produced, is cutting out and crippling the China trade."

From each of the districts of Taiwu, Lukpo and Loting, Mr. Ford obtained and sent to Kew copious and excellent specimens. These have been examined by my colleague, Professor Oliver, who informs me that they certainly all belong to the same species, and that this is undoubtedly *Cinnamomum Cassia*, Blume. Mr. Ford took great pains to ascertain if this was the exclusive source of *Cassia lignea*. He reports:—

"This is the *only* tree from which cassia bark, 'buds,' or leaves of commerce in China, so far as could be ascertained from personal inspection and reports, are obtained. All the trees seen in the districts of Taiwu, Loting and Lukpo, and intermediate localities where cassia was grown in smaller quantities, were of this species, nor were there, apparently, distinct varieties of the species in cultivation. The cultivators and other natives were much interrogated as to whether they knew or had heard of any other tree which yielded the products under notice,

and the invariable reply was that there was no other kind. There is, therefore, I think, no doubt but writers who have named other kinds as cassia-yielding trees of China have been mistaken or misinformed on the subject. One writer alludes to a tree in terms which partly corresponds to the description of *Machilus velutina*, Champ., another tree belonging to Lauraceæ, and indigenous to South China. It is quite possible that this tree may have been supposed by a casual observer to yield cassia bark, because it is sometimes grown in plantations intermixed with those of *Cinnamomum Cassia*. The trees are reared, planted, and treated in precisely the same manner as the cassia trees; but the bark is required for a very different use, viz., to supply a glutinous extract which is used to stick together powdered cassia bark and sandal wood (*Santalum album*) to form the joss-sticks used for incense. *Cinnamomum Burmanni*, Bl., which it has been supposed may probably yield 'in part the cassia bark of the Canton market,' does not, I feel sure, supply cassia bark to any extent. I did not see it anywhere cultivated; nor was it seen growing wild in any but small quantities, and these wild trees bore no signs of having been cut as had the cassia trees; many natives were asked if it was ever used; but, with one exception, all denied that it afforded any cassia bark. The one exception was an old woman, who was cultivating a field of Indian corn close to a few small trees of *Cinnamomum Burmanni*, and who said that its bark was sometimes, but rarely, used to adulterate the true cassia bark."

Mr. Ford on his return journey paid a visit to the well-known Chinese botanist, Dr. Hance, H.M. Vice-Consul at Whampoa, who identified the specimens of the cassia lignea tree collected by Mr. Ford as belonging to *Cinnamomum Cassia*. There is, in fact, in the Kew Herbarium a specimen of the same species collected by Dr. Hance in 1876; but I have searched in vain to see if Dr. Hance has published anything about it, and the specimen bears no note that it is the source of *Cassia Lignea*. This specimen is the material upon which the plate given by Bentley and Trimen is based, and represents no doubt the true plant.

*Cinnamomum Cassia* was first described by Blume, in 1825.[1] The species was apparently founded on cultivated specimens from Java, where Blume states it was "ex China introductum."

The Kew Herbarium possesses a cultivated Java specimen contributed

[1] "Bijdragen Fl. Nederl. Indië," ii., p. 570.

by the Leyden Herbarium. This is no doubt an authentic type of the plant described by Blume; and Professor Oliver finds that it agrees precisely with the plant collected by Mr. Ford on the West River. It may be, therefore, considered finally settled on the one hand, that the Chinese *cassia lignea* plant is really the *Cinnamomum Cassia*, Blume, and on the other hand, that the plant cultivated in Java is identical with that now known to be the source of the spice in China.

It is remarkable that though the cultivation of the *cassia lignea* tree has apparently been carried on in Southern China from time immemorial, it does not appear to be indigenous there.[1] In Cochin-China, however, there appears to be some probability of its being really wild. *Cinnamomum Cassia* is, botanically, very closely allied to *C. obtusifolium*, Nees, one of the species from which a similar product is obtained on the Khasia hills.

It only remains to give Mr. Ford's account of the mode of collecting and preparing the bark. He obtained and sent to this country a set of the implements, which are deposited in the Kew Museum.

"*Bark.*—When the trees are about six years old, the first cut of bark is obtained. The season for barking commences in March and continues until the end of May, after which the natives say the bark loses its aroma, and is therefore not removed from the trees. The branches, which are about an inch thick, being cut to within a few inches of the ground, are carried to houses or sheds in the vicinity of the plantations. All the small twigs and leaves being cleared off, a large-bladed knife, with the cutting-edge something like the end of a budding knife, is used to make two longitudinal slits and three or four incisions, at sixteen inches apart, round the circumference through the bark; the bark is then loosened by passing underneath it a kind of slightly curved horn knife with the two edges slightly sharpened. Pieces of bark sixteen inches long and half the circumference are thus obtained.

"The bark, after its removal and while it is still moist with sap, is then laid with the concave side downwards, and a small plane passed over it, and the epidermis removed. After this operation the bark is left to dry for about twenty-four hours, and then tied up in bundles about eighteen inches in diameter, and sent into the merchants' houses in the market towns.

[1]The earliest printed notice in works professing to give botanical information about China appears to be in Martini's "Atlas Sinensis" (1655). See Bretschneider's "Early European Researches into the Flora of China," p. 13.

"*Leaves.*—The leaves which are cleared from the branches that are barked are carefully preserved and dried, and afford by distillation Cassia oil. A large number of leaves are sent to Canton, where I was told the operation of distilling is performed.

"*Twigs.*—These are removed from the cut branches at the same time as when the leaves are obtained. They are a marketable commodity for native uses.

"*Buds.*—Cassia-buds are the immature fruits. They are gathered when about one-eighth grown. Buds, and the seeds which are annually required for sowing, are obtained from the trees ten years and upwards of age that are left standing at about fifty and a hundred feet apart amongst the trees which are cut down every six years for their bark. These seed-bearing trees are not cut unless there is a demand for the very thick bark on their trunks, when some of the trees which can be conveniently spared are sacrificed.—*Phar. Jour. and Trans., January 20, 1883.*

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## PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

*The Permanganate Test for Benzoic Acid.* Gehe & Co., have observed that benzoic acid sublimed from benzoin, when dissolved in not perfectly pure acetic acid and reprecipitated by water, would respond to Schacht's test for benzoic acid from Siam benzoin. They have further observed that benzoic acid sublimed from Siam benzoin at a temperature not exceeding 125°C. is white, and when tested according to the new German Pharmacopœia, with potassium permanganate will after 8 hours, show a brown color, the same as benzoic acid prepared from Palambang benzoin, urine or toluol. O. Schlickum has made similar observations. The first portion of benzoic acid obtained by sublimation, was white and remained white, and did not affect the test; the acid subsequently obtained was yellowish and reduced the permanganate, which action, however, gradually diminished in consequence of the resinification of the empyreumatic oil. Benzoic acid containing cinnamic acid will, of course, reduce permanaganate, but will also thereby develop the odor of oil of bitter almonds.—*Phar. Zeitung*, 1882, p. 617, 780, and 792.

*Recognition of Blue Colors.*—Indigo is decomposed by heat and decolorized by chlorine, hypochlorites and nitric acid. Prussian blue is

decomposed by heat and yields a residue of ferric oxide; it is not affected by chlorine or hypochlorous acid, but is decolorized by potassa, the blue color being restored by acids. Logwood blue is changed to red on the addition of a little acid, and by heat is decomposed giving a residue of alumina and cupric oxide. Ultramarin is not altered by heat, but at once decolorized by nitric acid. Saxony blue is decomposed by caustic alkali, but restored by an acid. In a mixture of Prussian and Saxony blue, the former is decomposed by chlorine or nitric acid, while the latter requires the action of potassa to produce the same effect.—*Phar. Zeitung*, 1882, p. 609. *Gem. Wochenschr.*

*Blaud's Pills.*—The "Pharmaceutische Zeitung," 1882, p. 564, publishes various directions for preparing these pills, as follows:

1. Exsiccated ferrous sulphate 10·12, potassium carbonate 15·0, milk-sugar 6·0, syrup 7·5 gms. make 100 pills. A metallic lustre exceeding in elegance the coating with gold or silver may be given to the pills by rolling them upon a hard board in coarsely powdered graphites, dampened with a few drops of alcohol.—*M. V. Valta.*

2. Potassium carbonate, ferrous sulphate aa 15·0, powdered althea 1·5, tragacanth 1·0, glycerin ointment (composed of glycerin and tragacanth) 1·0 to 1·5 gm. A greenish, plastic mass is the result from which pills are obtained which harden in ten or fifteen minutes and are not deliquescent.—*E. Rudeck.*

3. The water of crystallization contained in the ferrous sulphate is to be replaced by powdered althea, the mass formed with a mixture of equal parts of mucilage and glycerin, and the pills dried in a drying closet.

4. Potassium carbonate 15·0, exsiccated ferrous sulphate 7·5, powdered althea 7·5, powdered tragacanth ·3, glycerin sufficient; make 100 pills. —*O. Spoerl.*

5. Like 3, except that the mass is formed with honey.—See also *American Journal of Pharmacy*, 1871, p. 307; 1881, p. 603.

*For Masking the Odor of Iodoform*, Dr. C. Scherk recommends carbolic acid. On rubbing together 10 gms. of iodoform with ·05 gm. carbolic acid and 2 drops of oil of peppermint, the disagreeable odor of iodoform is completely masked and will not appear again even on heating. The addition is somewhat less effectual if vaselin be used for the ointment; but is still more agreeable than tonka, balsam of Peru, oil of caraway, or oil of peppermint alone.—*Phar. Zeitung*, 1882, p 740; *Klin. Wochenschr.*

*Stillingia Liniment.*—Oil of stillingia ℥j, oil of cajuput ℥ss, oil of lobelia ℥ij, alcohol ℥ij; mix. Used as a local application in croup, and as a cough medicine, in doses of one drop on a lump of sugar.—*Eclectic Med. Jour.*, 1883, p. 45.

*Sanitas Oil* is oil of turpentine which has been exposed while floating upon water to a blast of hot air, whereby it is oxidized and increased in density. The water having dissolved some of the products of oxidation forms the *sanitas fluid*. The properties are antiseptic and disinfectant; the oil, it is said, equals in effect carbolic acid, thymol, and iodoform, and is neither caustic nor irritating. One part of the fluid to ten parts of water is used as a gargle in ulcerated throat, and a deodorizing mouth wash is prepared from ten to twenty drops to one ounce of water.—*South. Dent. Jour.*, 1883, January, p. 523; *London Dent. Record.*

*Itch Liniment*, which has been successfully employed in Rostock for years, according to Dr. Brunnengraeber, consists of purified storax 40, olive oil 5, and alcohol 5.—*Phar. Handelsbl.*, 1883, No. 1.

*Use of Cantharidin.*—E. Dieterich states that cantharidin in the form of cantharidates dialyzes readily provided the parchment paper has been properly made, and by this process may be prepared on a large scale. He recommends the substitution of cantharidin for powdered cantharides in the proportion of 1 of the former for 200 of the latter, and gives the following formulas to replace the corresponding preparations of the German Pharmacopœia:

*Collodium Cantharidatum.*—Colloxylin 10, ether 200, alcohol 35, castor oil 5, cantharidin 1 gram.

*Emplastrum Cantharidum ordinarium.*—Cantharidin 1, yellow wax 400, suet 100, turpentine 100 parts.

*Emplastrum Cantharidum perpetuum.*—Rosin 500, yellow wax 500, turpentine 370, Burgundy pitch 330, suet 200, cantharidin 1, powdered euphorbium 60 parts.

*Unguentum acre.*—Yellow wax 60, rosin 120, turpentine 240, lard 1,000, cantharidin 1, powdered euphorbium 40 parts.

*Unguentum Cantharidum.*—Cantharidin 5, olive oil 4,000, yellow wax 2,000 parts.

Since 1 gram of cantharidin costs but little more than 200 grams of powdered cantharides, the cost of the above preparations is scarcely increased.—*Phar. Zeitung*, 1882, p. 608.

*Brassicon*, which for a long time has been used in the district of

Kiew against headache is prepared from oil of peppermint ʒss, volatile oil of mustard, gtt. vj, camphor gr. x, ether ʒj, alcohol ʒiij, and sufficient tincture of peppermint or of melissa, to impart the desired shade of color.—J. K. Mueller, *Phar. Zeitschr. Russl.* 1882, p. 783.

*Compound Tincture of Cajuput.*—Oil of peppermint, oil of cloves, oil of cajuput, oil of anise *aa* ℥j, alcohol ℥jv. Mix. It is a powerful stimulant.—*Eclec. Med. Jour.*, 1883, p. 45.

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## PHARMACEUTICAL NOTES.

By R. F. Fairthorne, Ph.G.

*Terbromide of Arsenic and the Solution of same.*—The solution of this substance has obtained some celebrity on account of having been found to act in a beneficial manner in the treatment of diabetes. Having had occassion to prepare it, I thought it might be of interest to readers of this Journal to give a short account of the method employed by me. The terbromide of arsenic was made in the following manner:

Take of

| | |
|---|---|
| Metallic arsenic, | 77 grains. |
| Bromine, | 240 " |

Having placed the bromine in the bottom of a long test-tube immersed in ice water, add the arsenic in powder in small portions at a time, agitating gently after each addition, and allowing the mixture to become cool before adding more of the metal; after the whole has been put into the tube, close this with a cork, remove from the water, and occasionally agitate during six hours; then pour into a suitable glass-stoppered vial. Terbromide of arsenic is a dense, orange-colored liquid, slightly volatile at ordinary temperatures, but entirely so by application of heat with the production of yellow pungent fumes.

The solution referred to is made by taking of

| | |
|---|---|
| Terbromide of arsenic, | 100 grains. |
| Distilled water, | 10 fluidounces. |

Mix and dissolve.

This forms a canary-colored liquid having an odor that recalls that of chloral. The dose which has usually been given has been two drops, containing the twenty-fourth of a grain of the arsenical salt, repeated every four hours.

In preparing the terbromide great caution is necessary, as the action of bromine on arsenic is very violent, and unless great care is taken, so much heat is produced upon the addition of the metal that it becomes red hot, and copious fumes of the bromide of arsenic are given off, which of course are very poisonous.

*Ammonia Liniment*, U. S., 1880, is ordered to be made by mixing 30 parts of water of ammonia and 70 parts of cotton-seed oil. If these directions are followed, and the cotton-seed oil employed is the same as that which is in general use in this city, a very unsatisfactory preparation will be made, on account of the oil not readily uniting with the ammonia. In some instances I have known this mixture to be repeatedly shaken several times daily for a week, and yet to completely separate after standing ten minutes. This difficulty can be overcome by the addition of 15 per cent. of olive oil that has been exposed to the air and become slightly rancid. This should be mixed with the cotton-seed oil, previous to the ammonia being added. It is probable that the water of ammonia would unite with the cotton-seed oil that had become rancid through exposure through atmospheric influences.

*The Two Extracts of Aconite.*—The extract of aconite now officinal, being prepared from aconite root is a much stronger preparation than that which was officinal in the Pharmacopœia of 1870, the latter having been made from the leaves. The extract of the root is at least three times as strong as the last-named. The dose of that made from the root as given in the dispensatories is from one-sixth to one-fourth grain, whilst that of the preparation from the leaves is from one-half to one grain. It is unfortunate, too, that the officinal titles of the two extracts are identical. Under these circumstances there will be liability of serious errors, if not fatal mistakes being made, from the fact that some physicians, not taking into consideration that Extractum Aconiti now represents a preparation so much stronger than what it did previous to the appearance of the present Pharmacopœia, continue to prescribe it in the same dose as formerly, and unless the druggist to whose care the prescription, containing this article, called the attention of the prescriber to the change made, or if this was not possible, dispensed the extract of the leaves, very unpleasant results might occur.

*Tinctures of Nux Vomica and Ignatia*, according to the formulas given in the new Pharmacopœia (1880), are directed to be prepared in such manner that they shall contain respectively 2 per cent. of extract in the first-named tincture, and 1 per cent. in the last. This appears to be a wise regulation and a step towards exactness of production, so much desired by progressive pharmacists. It might have been desirable, if such a plan had also been adopted in verifying the strength of other tinctures, such as tinctures of aconite root, cannabis indica, and gelsemium.

## NOTE ON UNGUENTUM HYDRARGYRI NITRATIS.[1]

*Editor of the American Journal of Pharmacy.*

Below you will find the working formula, by which I make nitrate of mercury ointment, which is not affected by the use of a metallic spatula; as I told you to-day, I have never investigated the cause of this non-reduction.

Take of

| | |
|---|---|
| Mercury, | ℥jss. |
| Nitric acid, | ℥ij. |
| Lard, | ℥ss. |
| Neats' foot oil, | ℥xijss. |
| Powdered camphor, | ℥ss. |

Melt the fat together at a temperature not exceeding 170°F., dissolve the camphor in the hot fats, add the mercury previously dissolved in the nitric acid, and stir the mixture while cooling.

You will notice that I use less acid than was directed by the Pharmacopœia of 1870, but the mercury strength is the same. It is evident to my mind that the camphor has some effect which is a benefit to the preparation, and I intend to investigate the reaction that takes place as soon as convenient.

Yours, etc.

F. M. Tilton, Ph.G.

*Haddonfield, N. J., February* 13, 1883.

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**Tincture of Iodine.**[1]—In preparing this tincture I observed that, if a small quantity of chloride of sodium be added to the mixture of iodine and alcohol contained in a glass vessel, the iodine became very readily soluble. The use of a mortar is entirely done away with, and labor and trouble might be saved by this simple addition.—*Philadelphia,* Feb. 14, 1883; Fred. C. Lehman, Jr.

**Adulterated Gum Arabic.**—Herz has met with a gum arabic which, besides yellowish and reddish pieces, some of them weighing 40 gm., contained about 8 per cent of tragacanth, mostly the nodular Syrian variety, but likewise opaque flakes and vermiform Morea tragacanth, some pieces measuring four centimeters. Such adulteration is said to be of not unfrequent occurrence in Southern Germany. *Phar. Zeitung,* 1883, No. 1

[1]Read at the Pharmaceutical Meeting, February 20th.

# TURPENTINE: ITS NATURE AND ADULTERATIONS.[1]

By Professor Henry E. Armstrong, Ph.D., F.R.S.

In the course of investigations on the terpenes, camphor and allied compounds, in which I have been engaged during several years past, the opportunity has occurred of gradually collecting a number of data which probably are of sufficient technical value to find a place in the "Journal of the Society of Chemical Industry."

Thanks to the kindness of my friend, Mr. E. Phillips, of Messrs. Ingall, Phillips & Co., I was enabled to examine average samples of most of the cargoes of turpentine landed by his firm during the years 1877 to 1880, and thus to obtain a clear insight into the character of the commercial article. The high price of turpentine during the past few seasons has undoubtedly led dealers here to adulterate it, and it was to be feared that shippers might not uniformly resist temptation; therefore, at the request of the above-mentioned firm, since the beginning of last year, I have regularly tested all cargoes landed at their wharves.

The crude resinous exudation, formerly known as "turpentine" is no longer an article of commerce in this country, the obviously rational course being nowadays adopted of separating it into its constituents, "spirits of turpentine," or "turpentine oil" and resin. On this account the name "turpentine"—*vulgare* "turps"—is now commonly employed as synonymous with the longer appellation, spirits or oil of turpentine, and it is in this sense that the term is employed in the paper.

The commercial varieties of turpentine mainly consist of hydrocarbons of the formula $C_{10}H_{16}$, of which certainly *three* distinct classes may be distinguished, viz.: *terpenes*, *citrenes*, and a third of which *sylvestrene*, the characteristic constituent of Russian turpentine, is the type. Under *terpenes*, I include those varieties which boil at about 156° C.; under *citrenes*, those which boil at about 176° to 178°, such as are the chief constituents of the oils derived from various species of *citrus*.

*French Turpentine.*—It is generally stated that French turpentine is the produce of a single species of conifer, *Pinus maritima*. It certainly is of remarkably uniform quality, judging from the almost constant rotatory power of samples which I have had occasion to examine at various times, and probably the properties of the terpene of which the French oil mainly consists are not very different from those of the commercial article. Using any form of polarimeter which admits of the observation being made in monochromatic light—it is, perhaps, well to note that the Soleil form cannot be employed for the examination of turpentine—and operating with a 200 mm. column, the value of $a_D$ is on the average about $-60°$ to $-61°$.

*American Turpentine.*—American turpentine is said by Hanbury and Flückiger ("Pharmacographia," 1st ed.) to be chiefly the produce of the swamp pine (*Pinus australis*), this and the loblolly pine (*Pinus tæda*) being, they say, the most important sources of turpentine.

The following particulars regarding the separation of the hydrocarbon from the crude resinous exudation will probably be of interest. I am indebted for them to Dr. Thomas F. Wood, of Wilmington, N. C.; they

[1] From the "Journal of the Society of Chemical Industry," December 29, 1882.

were written at the request of Mr. Charles Rice, American editor of the "Pharmacographia:"

"Turpentine is distilled in copper stills now. Formerly iron stills were used. All crude turpentine is distilled with water. A fifteen-barrel still (barrel weighs two hundred and eighty pounds) is charged early in the morning. Gentle heat is first applied until the mass is liquefied, and a coarse wire skimmer is used to remove the chips, bark, leaves, and such other foreign substances as rise to the surface, the temperature meanwhile rising until 316° F. is reached. All the accidental water (that contained in the crude turpentine as it comes from the forest) having been distilled off, a small stream of cold water is now let in, so that the heat is kept at or below 316° F., the boiling point of oil of turpentine. The oil of turpentine and water now come over, and the mixture is caught in a wooden tub. The distiller tests the quality of the flow from time to time in a proof-glass, and the distillation is continued until the proportion of water coming over is 9 of water to 1 of oil of turpentine. At this stage the heat is withdrawn, the still-cap is taken off, and the hot resin is drawn off by a valvular cock at the side of the still near the bottom. This resin passes through a strainer before it reaches the vat, to rid it of foreign substances, which may not have been previously removed by the skimmer. The yield of oil of turpentine from 'virgin dip' (the first exudation from a newly-boxed tree) is about 5 gallons to the barrel, about 20 per cent. being left in the resin,[1] since the removal of a larger proportion would darken the color, and consequently depreciate its value. The yield from 'yellow dip' (the runnings of the second and subsequent years) is about 4 gallons to a barrel. The yield from 'scrapings' (the inspissated gum from the tree facings) is about 2 to 3½ gallons, according to age, and also to the proportion of trash which it contains."

The separation of turpentine, by what is practically a steam distillation process, serves to explain the fact which, until I received the above information, had often surprised me, that the commercial article is uniformly free from products of the decomposition of resin by heat.

Some idea of the importance of the turpentine industry will be gathered by inspection of the following table, representing the number of barrels imported into London since 1872:

| | | | |
|---|---|---|---|
| 1873 | 44,495 | 1878 | 56,221 |
| 1874 | 57,720 | 1879 | 42,960 |
| 1875 | 57,093 | 1880 | 39,649 |
| 1876 | 57,371 | 1881 | 63,724 |
| 1877 | 49,500 | 1882 | 57,489 |

Probably about two-thirds of the entire quantity sent to this country is landed in London.

In so far as general properties are concerned, there is no practically distinguishable difference, other than in color, I believe, between various samples of the commercial article, but tested by the polarimeter they vary considerably.

[1] The fact that the whole of the hydrocarbon is not removed accounts for the statement sometimes made, that "resin spirit" is optically active, that made from pure resin, according to my experiments, being inactive.

The chief port of shipment is Wilmington, and most of the turpentine from this port, like that from Bordeaux, is of remarkably uniform quality. Thus, out of thirty-five samples, representing in all cases bulks of several hundred barrels, and in a number of cases bulks of from 1000 to 2000 or more barrels, no less than twenty-eight samples varied in rotatory power (value of $a_o$ per 200 mm.), only within the very narrow limits of 27° 6′ to 28° 35′; four samples had an inferior rotatory power of 24° 29′ to 26° 40′, and only three had a superior rotatory power of respectively 29° 31′, 31° 21′, and 32° 38′.

That shipped from Savannah, on the other hand, is, as a rule, characterized by a relatively low rotatory power, *e.g.*:

| | | | |
|---|---|---|---|
| Ex. 1569 barrels ..... | $a_o = 22° 21′$ | Ex. 1696 barrels ..... | $a_o = 19°$ |
| Ex. 1000 " ..... | $a_o = 24° 9′$ | Ex. 1870 " ..... | $a_o = 20° 33′$ |
| Ex. 1383 " ..... | $a_o = 20° 22′$ | Ex. 1200 " ..... | $a_o = 21° 21′$ |
| Ex. 1571 " ..... | $a_o = 19° 39′$ | Ex. 1595 " ..... | $a_o = 19° 12′$ |

In the case of the last of these shipments, I had the opportunity of taking five samples, each representing about one-sixth of the bulk, which gave the following values: 21° 4′, 21° 19′, 18° 13′, 17° 38′, and 20° 6′. I have not been able to ascertain whether the turpentine shipped from Savannah is the product of a different tree, or whether the difference in climate between the two districts, of which Wilmington and Savannah are "centres," is the cause of the marked variation from what may be termed the Wilmington type. I trust that the publication of this paper may, as one result, lead to my being favored with information on this point.

Judging from the opportunities which have presented themselves for examining turpentine shipped from Charleston, the deliveries from this port would appear to comprise turpentine of somewhat high rotatory power, as well as those of the Wilmington and Savannah types:

| | | | |
|---|---|---|---|
| Ex. 1000 barrels ..... | $a_o = 30° 24′$ | Ex. 2179 barrels ..... | $a_o = 24° 15′$ |
| —— " ..... | $a_o = 30° 38′$ | Ex. —— " ..... | $a_o = 19°$ |
| Ex. 250 " ..... | $a_o = 33° 33′$ | Ex. 1874 " ..... | $a_o = 26° 42′$ |
| Ex. 1689 " ..... | $a_o = 28° 15′$ | Ex. 1886 " ..... | $a_o = 29° 39′$ |
| Ex. 200 " ..... | $a_o = 24°$ | | |

Other parts also furnish a somewhat irregular product; the values, however, always lie within those already given, and in the majority of cases belong to the Wilmington type, Brunswick alone exhibiting a marked tendency to furnish a product of the Savannah type.

Commercially, I believe, no distinction is made between the turpentine shipped from various American ports; nor indeed is French turpentine, which is now a comparative rarity in the English market, regarded as having distinctive qualities. My observations on the whole justify this practice: French turpentine is slightly less readily oxidized, absorbing oxygen somewhat less rapidly than American turpentine, but the difference is probably insufficient to make itself felt in practice.

*Russian Turpentine.*—Commercially this variety is of no importance, as it cannot well be used in paint or varnish-making, both on account of its unpleasant odor and of the extreme readiness in comparison with French or American turpentine with which it absorbs oxygen, forming a viscid oil; its vapor appears also to produce far more marked physiological effects than either of the ordinary oils, inciting violent headache in many individuals

It is the product of *Pinus sylvestris*, but I have not been able to ascertain whether the turpentine is specially collected, or is a mere by-product. According to one account which I have received, the waste timber is piled into heaps and a fire lighted; the resinous matter which drains away is then collected and the turpentine extracted from it by distillation.

Different samples are remarkably different in their optical character, as the following numbers show:

| | | | |
|---|---|---|---|
| $a_v$(per 200 mm.) = | 36° 29′ | 44° 11′ | 40° 42′ |
| | 36° 7′ | 41° 0′ | 46° 45′ |
| | 34° 18′ | 35° 28′ | 36° 4′ |
| | 38° 58′ | 30° 42′ | 37° 5′ |
| | 32° 27′ | 35° 20′ | 42° 10′ |
| | 31° 20′ | 38° 6′ | 39° 52′ |
| | 34° 8′ | 45° 10′ | 30° 10′ |
| | 39° 58′ | 38° 4′ | |

Excepting the first four, all these samples were drawn from single barrels, and were obligingly furnished to me by Mr. Kingzett.

Russian turpentine has been shown by Tilden, "Chem. Soc. Trans." 1878–80, to consist of a peculiar $C_{10}H_{16}$ hydrocarbon, the so-called *Sylvestrene* of Atterberg (Ber. 10, 1202), and of an isomeride possessing the character of American turpentine. Sylvestrene, according to these authors, has a *specific* rotatory power of $(a_v) = 19{\cdot}5°$ (Atterberg), 19·6° (Tilden), that of the associated hydrocarbon being 36·3° (Atterberg). In conformation of the assumption that one of the constituents of Russian turpentine is probably identical with the main constituent of American turpentine, I may mention that I have separated from the latter by fractional distillation a portion having a rotatory power per 200 mm. of no less than 49° 34′, and that on several occasions, by submitting American turpentine to air oxidation, and afterwards distilling off the unaltered hydrocarbon by steam, I have obtained products of considerably higher rotatory power than the original oils. I have also examined several samples received from Mr. Kingzett of the hydrocarbon carried over by the air current during the air oxidation of Russian turpentine. In most cases these have been almost free from sylvestrene, and have exhibited a higher rotatory power than the original crude turpentine from which they were derived.

The numbers above given fluctuate within wide limits, and are of interest as indicating that the proportions in which the two recognized constituents of Russian turpentine are present probably vary considerably, and also that other perhaps isomeric hydrocarbons are mixed with them; they serve to confirm the idea that American turpentine is also a mixture of isomeric hydrocarbons. I may add that certain observations even lead me to think it not unlikely that the low dextro-rotatory power of American turpentine is due to the presence of a lævo-rotatory terpene; this would serve to explain the difference in optical character of products from different localities. The comparative study of American turpentine—and indeed generally of oils containing $C_{10}H_{16}$ hydrocarbons—from this point of view, I think deserves attention; variations in climatic and other conditions may have led to a gradual differentiation both in botanical and physiological character of a single parent stock.

*Method of Analysis.*—The terms "petroleum spirit" and "petroleum oil" as commercially used do not admit of very precise definition; for the purpose of this paper, I would therefore define petroleum spirit as being that portion of crude petroleum which may be volatilized by means of steam from water boiling at atmospheric pressure, and pretoleum oil as being the non-volatile portion. Judged of by this definition, commercial spirit and oil are, as a rule, more or less mixtures; the amount of spirit in the best burning oils is, however, small.

The presence of petroleum oil in turpentine is readily detected and the amount estimated by steam distilling. Unless it has been freely exposed to the air for a long time, but a mere trace of viscid matter remains on steam-distilling turpentine; on one or two occasions only have I met with samples containing a small amount of resin, which was left as a solid on distilling off the turpentine by a steam current. Should more than a few tenths of a per cent. of non-volatile matter remain, it is probable that petroleum is present. This usually betrays itself by the more or less marked blue fluorescence of the residue; bnt should this criterion fail, the behavior of petroleum and of the non-volatile product of the air oxidation of turpentine on digestion with dilute nitric acid will serve to differentiate them. The latter is readily oxidized and dissolved; the former does not alter much in bulk, but apparently undergoes more or less complete nitration. I have never yet met with a sample containing resin oil, but it would not be difficult to detect it, as it is oxidized by nitric acid, and behaves in a most characteristic manner when triturated with a paste of slaked lime, forming the well-known grease.

The detection and estimation of petroleum spirit is less readily effected. The method which I employ is based on the different behavior of turpentine and paraffins with sulphuric acid. The paraffins, it is well known, are almost unaffected, whereas turpentine is polymerized and for the most part converted into substances of high boiling point which do not volatilize in a current of steam. I say for the most part, because, as I have elsewhere stated, a certain amount of cymene and of a paraffinoid hydrocarbon is always produced. Inasmuch as the amount of cymene so produced varies with the strength of the acid and the temperature, being larger the more concentrated the acid and the higher the temperature, it is important always to work under uniform conditions, at as low a temperature as convenient, and to use diluted acid. I employ two strengths of acid, a mixture of 2 vols. acid and 1 vol. water (2 : 1 acid) and a mixture of 4 vols. acid and 1 vol. water (4 : 1 acid). The turpentine—500 c.c. is a convenient quantity—is placed with about one-fourth to one-third of its bulk of 2 : 1 acid in a well-stopped bottle, and the mixture is somewhat cautiously agitated. It soon becomes more or less heated, and as it is important to effect the polymerization at a temperature not much above the ordinary atmospheric temperature, the bottle is placed in cold water for a short time. After repeated agitation with the acid, the turpentine is converted into a viscid oil, and when this is the case, and no more heat is developed on continued agitation, the contents of the bottle is transferred to a separating funnel, the acid layer is run off and the oil poured into a flask; the latter having been connected with a condenser and a steam-pot—an ordinary tin can

answers admirably—all that is volatile is distilled off. The distillate is mixed with about half its bulk of 4:1 acid, and treated in a precisely similar manner.

The product from this second operation should only consist of a mixture of cymene and the paraffinoid hydrocarbon; in bulk it should not be more than 4 to 5 per cent. of the original hydrocarbon. This is the result of a very large number of estimations; as little as 3 per cent., however, has been obtained in experiments conducted with special care. If much more than about 5 per cent. be obtained, it is desirable to repeat the treatment with 4:1 acid.

If, from the result of this treatment, it appears probable that petroleum spirit is present, the product is placed in a well-stoppered bottle, together with several times its volume of concentrated sulphuric acid, heated to 50° to 60°, with which it is violently agitated. This treatment is repeated if desirable (weak Nordhausen acid being with advantage substituted for the concentrated sulphuric acid), and the residual hydrocarbon is separated, steam distilled, and then measured. The amount thus obtained should not exceed from ½ to 1 per cent. of the original bulk of turpentine. This treatment with concentrated acid affords a check on the previous determination.

If American petroleum spirit be thus treated it suffers comparatively little loss, so that the amount of hydrocarbon above 1 per cent. represents the *minimum* amount of petroleum spirit in the turpentine. The spirit from Scotch petroleum contains a very much higher proportion of hydrocarbons alterable by sulphuric acid, and therefore cannot be satisfactorily estimated.

To confirm the presence of petroleum spirit, the turpentine should be distilled. Petroleum spirit commences to distill at a temperature which may be above or below that at which turpentine boils, according to its quality, but always distills within comparatively wide limits of temperature; turpentine commences to boil near 160°, and almost entirely passes over below 180°.

The presence of resin spirit also affects the boiling-point in a similar manner. Evidence of the presence of this adulterant is also afforded by the increased yield of hydrocarbons on treatment both with 4:1 and concentrated sulphuric acid, as resin spirit also yields a cymene and paraffinoid hydrocarbon on treatment with 4:1 acid. The cymene from resin spirit being isomeric with that from turpentine, proof of the presence of resin spirit can be obtained by the detection of its cymene, but this is a somewhat delicate operation.

*Addendum.*—The method above described is also available for the analysis of solvent naphtha from coal tar and similar products; it is, in fact, the only method which is capable of affording results which approach exactness. The problem is by no means so simple, however, as the coal tar product itself contains, besides benzene and its homologues, basic bodies, hydrocarbons alterable by diluted sulphuric acid, and paraffins. Until, therefore, a considerable number of genuine samples have been examined, the method is chiefly of value as a qualitative test.—*The Pharm. Jour. and Trans.*, Jan. 20, 1883.

# VARIETIES.

THOMPSON'S CHLOROFORM LINIMENT, according to Dr. G. A. Parsons, is composed of chloroform, alcohol, ammonia water, spirit of camphor, tincture of aconite root, of each 2 ounces, spirit of nitrous ether 6 ounces.—*Med. Brief*, 1882, p. 508.

LEMONADE IRON, as prescribed by Professor Goodell, of the University of Pennsylvania, consists of tinct. ferri chlor. ʒij; acid. phosphor. dil. ʒvj; spirit. lemon. ʒij; syrupi ad ℥vj. M. S. a dessertspoonful in water after meals.—*Practitioner.*

AMUSSAT'S LAXATIVE SYRUP.—In the *Gazette Hebdomadaire*, 1882, No. 22 (*Lyon Medical*, June 4, 1882), we find the following formula for the preparation of the "sirop laxatif d'Amussat," or "sirop de suc d'herbes:" Rasped guaiacum wood, chicory root, burdock root, waterdock root (racine de patience), fumitory tops, tops of viola tricolor arvensis, (pensée sauvage), each 100 grams; senna leaves, 500 grams. Bruise the materials and infuse for 12 hours with 5 kilograms of boiling water. Strain, and make a second infusion with 3 kilograms of water. Strain under pressure, filter through paper, (evaporate to about one-fourth.—*Editor Am. Jour. Phar.*) and make with honey and sugar, each 3 kilograms, a syrup, which is also to be filtered through paper, and which should be of the density of 31° Baumé. Dose, one to two tablespoonfuls a day.—*N. Y. Med. Jour. and Obst. Rev., October.*

ORIGIN OF THE CEREAL GRAINS.—Wheat ranks by origin as a degenerate and degraded lily. Such in brief is the proposition which this paper sets out to prove, and which the whole course of evolutionary botany tends every day more and more fully to confirm. By thus from the very outset placing clearly before our eyes the goal of our argument, we shall be able the better to understand as we go whither each item of the cumulative evidence is really tending. We must endeavor to start with the simplest forms of the great group of plants to which the cereals and the other grasses belong, and we must try to see by what steps this primitive type gave birth, first to the brilliantly colored lilies, next to the degraded rushes and sedges, and then to the still more degenerate grasses, from one or other of whose richer grains man has finally developed his wheat, his rice, his millet, and his barley. We shall thus trace throughout the whole pedigree of wheat from the time when its ancestors first diverged from the common stock of the lilies and the water-plantains, to the time when savage man found it growing wild among the untilled plains of prehistoric Asia, and took it under his special protection in the little garden-plots around his wattled hut, whence it has gradually altered under his constant selection into the golden grain that now covers half the lowland tilth of Europe and America. There is no page in botanical history more full of genuine romance than this; and there is no page in which the evidence is clearer or more convincing for those who will take the easy trouble to read it aright.—*From "The*

*Pedigree of Wheat,"* by Professor Grant Allen, *in Popular Science Monthly for March.*

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THERAPEUTIC EFFECTS OF HYOSCYAMINE.—The following formula for its administration was brought into use, and has been found to meet every requirement as to strength, but lacks stability: Hyoscyamine (Merck's crystalline), four grains; glycerin, distilled water, of each half an ounce; carbolic acid, two minims; dissolve without heat. Dose, four to eight minims, given hypodermically.

It is very important to make the solution without heat, as heat renders the alkaloid nearly inert. Hyoscyamine is a most unstable alkaloid, and soon decomposes; so that the strength of any solution yet devised cannot be depended on for more than one month after its preparation.

1. The observations show the uncertainty of the action of hyoscyamine when given by the mouth, and the danger of large doses.

2. They also show the marked superiority of the hypodermic method, and the confidence with which, in some cases, its effects could be calculated on, and the dose increased or diminished in accordance with the violence of the patient.

3. In hyoscyamine, we have a drug which is often capable of controlling the violence of a furious maniac, and, it may be, checking the torrent of rushing ideas on which he is borne along, soothing without putting him to sleep, and, in these respects, differing from morphia or chloral. In noisy and destructive general paralytics, the quiet air of comfort and repose following a moderate dose was such a contrast with the previous condition as to strongly impress every one with the feeling that, by the introduction of hyoscyamine, another valuable aid had been secured in the care and treatment of such cases.

4. No curative action can be claimed for the drug. Even in acute mania it did nothing more than moderate or check, for a time, the violence of action, and, perhaps, render less vivid and overwhelming the terrifying whirlwind of delusion of the frantic patient.

Previously to procuring a supply of hyoscyamine, the ordinary tincture of hyoscyamus was given in large doses, sometimes as much as one ounce at a time, without much effect, except that of dilating the pupils; but it had no controlling power in cases which afterwards yielded to the more powerful alkaloid.—*Thomas Browne, M. D., in British Med. Journal; Atlanta Med. Register*, Jan. 1883.

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SULPHO-CARBOLATE OF SODIUM IN VOMITING.—The use of the sulphocarbolate of sodium in flatulent dyspepsia is well known. It is not, perhaps, so generally known as a remedy for the vomiting of pregnancy. I have used it in this affection for years, and find it rarely fails to give some relief. I give it in doses of seven grains in half an ounce of water. Though sometimes decidedly useful in the vomiting of displaced or abnormal conditions of the uterus, it is less uniformly so than in pregnancy, probably because flatulence is a less constant factor in the former cases. Where deep nerve disturbance exists, we must trust to more powerful remedies, hypo-

dermic morphia or atropine, or surgical procedures. The drug will, perhaps, be useful against sea-sickness, taken every two hours from the time of sailing. In one case—the only one tried—it appeared to have a good effect.—*Philip Miall*, in *Brit. Med. Jour.; Cinci. Lancet and Clinic*, Jan. 13, 1883.

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New Tests for the Detection of Albumen in Urine.—Dr. George Johnson, F.R.S., of London, is now using *picric acid* for the detection of albumen in the urine. The test was suggested to him by his son, Mr. G. Stillingfleet Johnson, who has long labored at chemical research, and believes that the test is free from fallacy. A saturated solution of picric acid has a specific gravity of 1,003, and immediately coagulates any trace of albumen which may be present in the urine to which it is added. The delicacy of the test is strikingly demonstrated when slightly albuminous urine is poured on to the surface of nitric acid, and the picric acid solution is added on the surface of the urine. An obvious advantage of the test, is that the powdered picric acid may be so conveniently and safely carried in the pocket, ready for the immediate and efficient examination of any urine suspected of being albuminous. It is only necessary to throw some of the powder into the suspected urine while it is warm, and to agitate slightly, in order to produce an obvious cloudiness, if any albumen be present.—*Boston Medical and Surgical Journal*, Nov. 9, 1882.

In the "Zeitschrift f. Analyt. Chem.," xxi, p. 301, Dr. A. Raabe mentions the following new reaction for albumen. To the well-filtered urine, contained in a narrow reaction tube, a small piece of crystallized *trichlor-acetic acid* is added. This is gradually dissolved on the bottom of the tube, and there, where the two fluids come into contact with each other, when albumen is present, a turbid zone, clearly visible and sharply confined. Normal urine, according to Raabe, gives no similar reaction, only if urates are present, in very large quantity, a weakly turbid condition follows, but this is not confined as mentioned, but spreads all over the fluid. Further, if the urine is heated, this turbidity, due to urates, disappears immediately, while such is not the case with the turbid ring caused by reaction of trichlor-acetic acid on albumen in the urine. Raabe considers the latter reaction as far more sensitive and reliable than the one with nitric, or even with metaphosphoric acid. In doubtful cases, especially, it would be of great service.—*Med. and Surg. Reporter*, Dec. 9, 1882.

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Emblic Myrobolans as a Laxative.—The editor of the "British Medical Journal" calls attention to a remedy, well known as an efficient laxative in Eastern countries, viz.: Emblic myrobolans, received from Mr. Martindale, and recently imported from India. It is the fruit preserved in sugar of *Emblica officinalis*, or *Phyllanthus emblica*. It is an euphorbiaceous tree; and the fruit which is about the size of an olive, or perhaps, somewhat larger, contains a hard angular seed. Several species of myrobalans were formerly used in medicine; and an old writer says "they restore youth, improve the complexion, the breath and the perspiration, and impart joy and hilarity." It is not alleged that this particular species

possesses these properties; but Dutt, in his *Hindu Materia Medica*, says that it is "cooling, refrigerant, diuretic, and laxative. It promotes the appetite, and acts as a tonic." He has tried it carefully in several cases of habitual constipation, and has no doubt that it is a valuable addition to the list of laxatives. It must be remembered that it is a natural fruit, and not an artificial preparation. It may be eaten at dinner or dessert. It is most valuable for children.—*N. C. Med. Jour.*, Nov.. 1882.

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THE DISTRIBUTION OF ASPHALTS.—Bituminous substances, apparently of organic origin, are found in various parts of the world. Sometimes they occur in a free state, as in the Island of Trinidad, and at others impregnating calcareous rocks, or serving as a cement to hold the particles together, as at Val de Travers or Seyssel.

For several reasons the asphalt lake in Trinidad possesses special interest for us. The island, which is the southernmost of the Lesser Antilles, lies off the northern coast of South America, and is easily accessible from any of our sea-ports. Here, amid the most luxuriant vegetation, is a lake three miles in circumference, on the surface of which lies a crust of asphaltum of such tenacity that in the rainy season a person can walk across it; but, under the influence of the hot sun it softens to a thick tar. This crust receives accessions from beneath, and formerly it would overflow and run into the sea, more than two miles away. A similar substance, known as "Jew's pitch," is washed ashore in considerable quantities around the borders of the Dead Sea. In Texas, south of Shreveport, there is said to be a pitch lake containing large quantities of bitumen, but little is yet known about it. In Southern California there are accumulations of asphalt on the coast at Santa Barbara, San Luis Obispo, etc., which resembles, when pure, that from Trinidad. It promises to supply the wants of the western coast, as Trinidad will that of the eastern part of this country.

In Kentucky there is a considerable quantity of asphaltic mineral which may some time be utilized for road-making.

An interesting and valuable asphaltic mineral, known as Albertite, is found in New Brunswick; and a similar one, called Grahamite, occurs in West Virginia and other parts of the country. In the mountains west of Denver, in Colorado, is a vertical bed of hard and brittle asphalt, not unlike Grahamite, while Albertite is found in small quantities in Lorain county, Ohio, and Casey county, Kentucky.

Bitumen is likewise found in Cuba, and is brought into commerce under the name of *chapopote*, or Mexican asphalt.

In Europe asphalt occurs chiefly in limestone, which forms, when crushed and packed, an excellent pavement. The principal points at which it is found are the following: Val de Travers, in the Swiss Canton of Neufchâtel, fourteen miles from Neufchâtel, and sixteen or seventeen miles by rail from the French borders; Seyssel, on the Rhône, in the French department of the Ain, about thirty-three miles from Geneva; Lobsann, a small town in northern Alsace; Vorwohle, in Braunschweig; and Limmer, near the city of Hanover. The Italian province of Caserta, in the neighborhood of Naples, supplies Rome with an asphalt much used for terraces and flat roofs.—*From "American and Foreign Asphalts," by* E. J. Hallock, *in Popular Science Monthly for December.*

# MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 20, 1883.

In the absence of the president, Mr. Andrew Blair was called to the chair.

The minutes of the last pharmaceutical meeting were read and approved.

Mr. Wallace Procter presented on behalf of Messrs. John M. Maris & Co. a gallon bottle nearly full of *Oil of monarda*, which has been in their possession for thirteen years, and in which there was a deposit of nearly one-third of its bulk of thymol, portions of which seemed to be very pure.

On motion the thanks of the college were directed to be returned to the donors. Professor Maisch directed attention to the pale color of the oil, and to the two strata of the thymol, the lower and thickest layer consisting of large crystals and being nearly transparent, while a much thinner layer on the top of the first one is composed of small crystals, giving it a white color; it would be interesting to determine the amount of thymol still remaining in the liquid.

Mr. Wallace Procter presented an air thermometer, with both Réaumur & Celsius' scale, that was given to his father by Mr. Henry W. Leslie, an apothecary in Bristol, Pa., and was dated on the back sixty years old in 1861; it was accepted with thanks.

Donations to the library were made as follows: From the British Pharmaceutical Conference, the Year-Book of Pharmacy for 1882; Report of the Chief Officer of the Signal Service Bureau for 1880; and a copy of the Chemist and Druggists' Diary for 1883.

Mr. M. William Coleman, a member of the present senior class, read a paper upon the composition and solubility of the *commercial sulphate of strychnine* (see page 113); the paper was listened to with satisfaction and referred to the Publication Committee.

Professor Maisch said he was gratified in two ways by this paper; first, that such a paper was offered by a member of the class, and next, that it cleared up several points in regard to this salt.

Professor Power called attention to the considerable difference in alkaloidal strength of the mono- and di-strychnine sulphate, and to the difference in the statements regarding the solubility of the latter in water, varying from 10 to 50 parts for 1 part of the salt.

Professor Maisch read a note from F. M. Tilton, Ph.G. of Haddonfield, N. J., giving a formula for the preparation of *unguentum hydrargyri nitratis* (see page 145) which yielded an ointment peculiar in this respect that it retained its color and did not discolor a metallic spatula when manipulated therewith; the ointment thus prepared was exhibited by Professor Maisch last year and was now again brought before the meeting; it had become darker in color, but did not affect iron even when rubbed up in the presence of water. Professor Maisch said that probably camphorate of mercury was formed, which salt is stated by chemical works to be nearly insoluble in water and alcohol, but slightly soluble in ether; he thought it might perhaps be soluble in fats. A member asked if the reaction that is

usual in preparing this ointment took place when made in this way, to which Mr. Thomson replied that there was no apparent reaction; but Professor Maisch had been informed by Mr. Tilton that nitrous vapors were given off, though from the amount of nitric acid used for dissolving the mercury he should judge it to be insufficient for oxydizing all the camphor to camphoric acid.

Professor Maisch read a note upon the preparation of *tincture of iodine* by Mr. Frederick C. Lehman, of the present class (see page 145); he effects the solution readily without trituration by adding a small quantity of chloride of sodium to the mixture. Professor Maisch stated that the solvent action of alkaline chlorides upon iodine in water was well known, and it might be presumed that a similar effect would be produced in presence of alcohol; but considering the slight solubility of sodium chloride in strong alcohol, he thought it remarkable that such a quick effect be produced as described in the note.

Professor Maisch exhibited a specimen of *syrupus rubi idæi*, which was sent to him last July by a former pupil of the college, Mr. Herman Tiarks, of Monticello, Ia., and was then two years old. It had been made by the process of the German Pharmacopœia, and has remained unaltered to the present time. The same process was adopted by the new U. S. Pharmacopœia, and was criticised by Professor Maisch as being entirely unsuited for our climate, since vinegar would be produced in the time directed for fermentation; the liquid should be expressed as soon as the sugar had been converted into alcohol and the pectin compounds precipitated.

Mr. Blair said that in his experience it was sufficient to keep the mashed berries over night, when they would be ready for expressing and finishing the syrup.

Mr. Boring thought that fermentation of raspberries altered the flavor of the syrup, and that the unfermented raspberry juice yielded a better-flavored syrup.

Dr. Wolff could speak from experience that the time allowed by the Pharmacopœia would result not only in vinous, but also in acetic fermentation, on account of the high summer temperature; if the fermentation was watched and as soon as completed, the juice was expressed and the sugar dissolved in it, a well-flavored and staple raspberry syrup would be obtained.

Professor Maisch read a continuation of the paper upon *fluid extracts* by Mr. Alonzo Robbins (see page 120), for which the thanks of the college were tendered to the author. It was too late to discuss some of the interesting points mentioned in this paper.

Mr. Thompson thought that it would tend to secure greater good if a committee was appointed to report on the various papers read, and on motion the chair appointed Messrs. Wm. B. Thompson, Wallace Procter, C. A. Heinitsh, and Dr. L. Wolff, as a committee to investigate the questions relative to the tincture of iodine and the formula for ung. hydrarg. nitratis.

The meeting then adjourned.

J. S. WIEGAND, *Registrar.*

## EDITORIAL DEPARTMENT.

PHARMACY IN THE FRENCH ACADEMIES.—It is well known that pharmacists have largely contributed to the progress of science, and that in this respect France stands second to no other country. Many of these eminent men were elected to membership in the French academies, a compliment well deserved by their scientific researches and attainments. The following brief account of these academies, giving also the names of the pharmacists who have been members thereof, is copied from the "Pharm. Journal and Transactions," of January 13th:

"A visitor to the new School of Pharmacy in Paris will readily perceive that French pharmacists are by no means disposed to forget the past history of their art. Good reason have they indeed to be proud of the parts played in the world of science by their predecessors, and M. Lefort needs no justification for taking the opportunity afforded by a recent meeting of the Paris Pharmaceutical Society to call attention specially to the extent to which pharmacy has been represented in the scientific academies of France.

"The first Academy of Sciences in France was founded in the year 1666, by Louis XIV., at the instigation of his famous finance minister, Colbert. It was intended to be devoted to practical science rather than to the reading of papers, and with this object laboratories were maintained at the royal expense at the place of meeting, in which experiments and observations were made and the results obtained were discussed by the members in common. Animal and vegetable products, minerals, and especially mineral waters, were submitted to such analysis as was then possible, and it was only natural that after a few years pharmacists should be called to take part in the work. The first pharmacist admitted into the Academy of Sciences, in 1686, was Moses Charras, the author of a 'Pharmacopée galénique et chimique,' and next, in 1699, came Nicolas Lémery, the author of the 'Cours de Chimie.' Then followed Boulduc, Geoffray, Rouelle and Cadet de Gassicourt. But the revolutionary wave that swept away men did not spare institutions, and a few months before Lavoisier was sent to the guillotine the academies in France were suppressed as useless. In 1795, however, the Convention established a new 'Institut des Sciences et des Arts,' which included all the academies as they now exist. In the new Academy of Sciences, as in the old, pharmacists have taken an honorable place, as will be seen from the following roll of names: Bayen, the two Pelletiers, Vauquelin, Parmentier, Baumé, Deyeux, Proust, Serullas, Robiquet, Lesson, Gaudichaud, Balard, Bussy, Gerhardt, Lecoq, Planchon, Berthelot, Chatin, Girardin, and Milne-Edwards. Each of these men was a legally qualified pharmacist; but there have been others also who commenced their scientific career in a pharmacy, among whom may be mentioned, Dumas, Frémy, and Trecul.

"The Academy of Medicine was founded in the year 1820, by a decree of Louis XVIII., and one of its duties was to be to reply to questions of the Government on all subjects affecting the public health, and particularly in respect to new and secret remedies, and natural and artificial mineral waters. Originally the Academy was divided into three sections, medicine,

surgery and pharmacy, and the first nine nominations to the pharmacy section were: Boullay, Deyeux, Fabre, Henri, Laugier, Pelletier, Planche, Robiquet and Vauquelin. Amongst the earlier elections by the Academy itself were: Boudet, Derome, Caventou, Guibourt, Labarraque, Bussy, Chevallier, Derosne, Frémy and Serullas. Since the year 1829 the Academy of Medicine has been divided into sections, of which that devoted to pharmacy is the eleventh, but pharmacists frequently figure in other sections. The list, given by M. Lefort, of eminent pharmacists who have been connected with this Academy as members, associates or correspondents, is too long for quotation here, and this is the less necessary since it includes many names that have already been mentioned. At present there is only the one class of members, limited to one hundred, and amongst them are included many whose names have frequently appeared at the head of articles published in these pages."

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Handwörterbuch der Pharmakognosie des Pflanzenreichs.* Von Professor Dr. G. C. Wittstein. Breslau: Eduard Trewendt. 1882.

Dictionary of Pharmacognosy of the Vegetable Kingdom.

The three first parts of this work have been noticed in our last volume; the fourth and fifth parts now before us treat of the drugs in the alphabetical order of their German names, commencing with Kornrade, Agrostemma Githago, and closing with Sandelholz, red saunders. Among the more important or interesting articles we mention coto bark, oil of rose geranium, croton seed and oil, cubebs, lac, dandelion, almonds and their products, manna, mints, ergot, myrobalans, cloves, allspice, hellebore, veratrum, olives, opium, balsam of Peru, pepper, quassia, rhatany, rhubarb, oil of rose, and others.

*Die Naturgeschichte des Cajus Plinius Secundus.* Leipzig: Gressner & Schramm. 15, 16 Lieferung.

Parts 15 and 16 of the German translation by Professor Wittstein, of Plinius' Natural History, complete the work and the appendix thereto, the latter comprising a full and classified index, which greatly facilitates the consulting of the work. The references and explanatory notes added in the text by Professor Wittstein, enhance the interest of the latter. The importance and value of the only work of the ancient Roman author that has reached us, consists in its being a full exposition of the arts and sciences at the beginning of the Christian era. Scientific researches, as understood at the present time, were then unknown, and the deductions made from observations were more easily inclined to erring; but Plinius was a keen observer and far in advance of the superstitions of most of his cotemporaries, so that a great deal contained in his work remains correct even when tested by the present extent of our knowledge. In preparing the translation, Professor Wittstein has consulted the works of most other commen-

tators of Plinius, and rendered the writings of the latter not merely interesting as historical relics, but through the annotations, as valuable as possible for present use.

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*Sur l'extraction des matières colorantes des urines bleus (indigotine et indirubine).* Par le Dr. C. Méhu. Paris, 1882.

On the extraction of the coloring matters of blue urine. Reprint from Annales des Maladies des organes génito-urinaires, I.

In his investigations of the blue coloring matter of urine, Dr. Méhu noticed that it dissolves with a violet color in the oils of anise and wintergreen; but both solutions are decolorized on boiling—that in oil of anise rapidly, and that in oil of wintergreen more slowly. Indigotin from indigo, on the contrary, dissolves in oil of anise with a violet color, which changes to blue on cooling, or finally to greenish. Oil of wintergreen yields with indigotin a solution which retains its handsome blue color for a long time. The author is engaged with the further investigation into the nature of the coloring matters of urine.

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The reception of the following pamphlets and reprints is herewith acknowledged:

*A Review of the Sixth Decennial Revision of the Pharmacopœia of the United States of America.* By D. Webster Prentiss, A.M., M.D., etc. Washington, D. C.

From "New Remedies," December, 1882.

*A Brief Review of the U. S. Pharmacopœia of* 1880. By Charles Mohr, Mobile, Ala.

From the "Druggist," January, 1883.

*Unification of Moneys, Weights, and Measures.* By Alfred B. Taylor. Philadelphia.

From the "International Review."

*The Dangers of Impure Ice.* Report to the Sanitary Protection Association of Newport, R. I.

From the "Sanitarian."

*Fiftieth Annual Report of the Managers of the Pennsylvania Institution for the Instruction of the Blind.* Philadelphia, 1883.

*Addresses Delivered on the Occasion of the Dedication of Cooper Medical College Building.* By Levi C. Lane, A.M., M.D., etc., and by Edward R. Taylor. San Francisco.

*The Bacillus Tuberculosis and some Anatomical Points which suggest the refutation of its etiological relation with Tuberculosis.* First communication. By H. F. Formad, B.M., M.D., etc.

From the "Philadelphia Medical Times," November 18, 1882.

*Scrofula and its Gland Diseases.*. An introduction to the general pathology of scrofula, with an account of the histology, diagnosis and treatment of its glandular affections. By Frederick Freves, F.R.C.S., Eng., etc. Philadelphia: Henry C. Lea's Son & Co. 8vo, pp. 77. Price ten cents.

*Bromide of Ethyl; the most perfect anæsthetic for short painful surgical operations.* By Julian J. Chisolm, M.D., Professor, etc. Baltimore.

From the "Maryland Medical Journal." January 1, 1883.